

PE13-018

FORD

8-23-2013

APPENDIX G

Engineering Review

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AND

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PE13-018

FORD

8-23-2013

APPENDIX G

Engineering Review

11

From: Corey SMALL <corey.small@valeo.com>
Sent: Friday, June 21, 2013 12:59 PM
To: Huang, Larry (L.)
Cc: Satish NADELLA <satish.nadella@valeo.com> (satish.nadella@valeo.com); Andersen, Erik (E.); ying.tang@valeo.com; Larry ENGEL
Subject: Re: P415 PCA Data
Attachments: CAC P415 with external blocker_internal cover.pptx

Larry,
Per your request;

Best Regards/Sincèrement,
Corey Small
Customer Technical Leader
(P) 1-248-209-8677
(C) 1-248-310-2334
Email: corey.small@valeo.com

On Tue, Jun 18, 2013 at 8:30 PM, Huang, Larry (L.,) <lhuang3@ford.com> wrote:

Satish,

Attached is the datasheet for "PCA-minus internal mask". Would you please provide the datasheet similar to Slid 2, for "Externally block bottom 7 tubes / 8 fins", but "**WITH INTERNAL MASK (COVER)**"? We will appreciate it if you can provide it to us by Thursday. Thank you very much.

Regards,

Larry Huang
Global Cooling/Heat Exchangers
Phone/Text Message: 313-805-2617
E-mail: lhuang3@ford.com
Building #2-3M29, Mail Drop: 1215

From: Huang, Larry (L.,)
Sent: Tuesday, May 07, 2013 8:51 AM
To: 'Corey SMALL'
Subject: RE: Summary of P415 Requested CAC Robustness Actions

Thanks, Corey.

Regards,

Larry Huang

Global Cooling/Heat Exchangers

Phone/Text Message: 313-805-2617

E-mail: lhuang3@ford.com

Building #2-3M29, Mail Drop: 1215

From: Corey SMALL [<mailto:corey.small@valeo.com>]

Sent: Tuesday, May 07, 2013 8:38 AM

To: Huang, Larry (L.)

Cc: Satish NADELLA; Andersen, Erik (E.); Kramer, Michael (M.T.); ying.tang@valeo.com; Guillermo GUADARRAMA; Blas-Fernando GUTIERREZ; Tyler, Jim (J.S.)

Subject: Re: Summary of P415 Requested CAC Robustness Actions

Larry,

I will positively confirm, and get back with you, but I am confident this does have the 14 cells with louvers. Thanks.

Best Regards/Sincèrement,

Corey Small

Customer Technical Leader

(P) 1-248-209-8677

(C) 1-248-310-2334

Email: corey.small@valeo.com

On Mon, May 6, 2013 at 5:52 PM, Huang, Larry (L.) <lhuang3@ford.com> wrote:

Corey,

That is good news. Thanks for the effort for locating the part.

You meant J1 DV CAC (int. 14 cells with louvers), right? A little manufacturing difference won't affect the performance. The following configs in external blocking are correct. When can we have the data? Thank you very much.

Regards,

Larry Huang

Global Cooling/Heat Exchangers

Phone/Text Message: 313-805-2617

E-mail: lhuang3@ford.com

Building #2-3M29, Mail Drop: 1215

From: Corey SMALL [mailto:corey.small@valeo.com]

Sent: Monday, May 06, 2013 5:32 PM

To: Huang, Larry (L.)

Cc: Satish NADELLA; Andersen, Erik (E.); Kramer, Michael (M.T.); ying.tang@valeo.com; Guillermo GUADARRAMA; Blas-Fernando GUTIERREZ

Subject: Re: Summary of P415 Requested CAC Robustness Actions

Larry,

Valeo was able to locate one original DV P415 CAC to test. The only difference on the DV part is that the cam lock is spin welded? Currently the outlet tank is just one piece and not welded. Would this part be acceptable to perform the three tests?

1) Externally block bottom 7 tubes / 8 fins

2) Externally block bottom 4 tubes / 5 fins

3) Externally block bottom 7 tubes / 8 fins 25% of the length across the CAC from the inlet side and the bottom 3 tubes / 4 fins the remainder of the length ("L" laying on its side).

Thanks.

Best Regards/Sincèrement,

Corey Small

Customer Technical Leader

(P) 1-248-209-8677

(C) 1-248-310-2334

Email: corey.small@valeo.com

On Fri, May 3, 2013 at 2:00 PM, Andersen, Erik (E.) <eanderse@ford.com> wrote:

Satish,

Can you please confirm data sheets will be provided today?

Thanks,

Erik Andersen

Core P/T Cooling
eanderse@ford.com
313-805-2966

From: Satish NADELLA [mailto:satish.nadella@valeo.com]

Sent: Monday, April 29, 2013 4:55 PM

To: Andersen, Erik (E.)

Cc: Kramer, Michael (M.T.); Corey SMALL <corey.small@valeo.com> (corey.small@valeo.com);
ying.tang@valeo.com; Tyler, Jim (J.S.); Widmann, Carl (C.A.); Weber, Erik (E.M.); Rodgers, Thomas (T.A.);
Huang, Larry (L.,)

Subject: Re: Summary of P415 Requested CAC Robustness Actions

Hi Erik,

We will have the data from the testing of the 3 samples on Friday this week. FYI, I have attached a schematic of the 3rd test option.

Regards,
Satish

On Fri, Apr 26, 2013 at 6:39 PM, Andersen, Erik (E.) <eanderse@ford.com> wrote:

Is there timing on the data sheets?

Erik Andersen

Core P/T Cooling
eanderse@ford.com
313-805-2966

From: Kramer, Michael (M.T.)

Sent: Tuesday, April 23, 2013 5:16 PM

To: Satish NADELLA; Corey SMALL <corey.small@valeo.com> (corey.small@valeo.com); ying.tang@valeo.com

Cc: Tyler, Jim (J.S.); Widmann, Carl (C.A.); Andersen, Erik (E.); Weber, Erik (E.M.); Rodgers, Thomas (T.A.); Huang, Larry (L.); Kramer, Michael (M.T.)

Subject: Summary of P415 Requested CAC Robustness Actions

Please provide ASAP timing for the following three data sheets all using the **original J1 P415 CAC**.

1) Externally block bottom 7 tubes / 8 fins

2) Externally block bottom 4 tubes / 5 fins

3) Externally block bottom 7 tubes / 8 fins 25% of the length across the CAC from the inlet side and the bottom 3 tubes / 4 fins the remainder of the length ("L" laying on its side).

Intent is to determine the maximum number of lower tubes that can be externally blocked and meet the heat rejection performance of today's PCA CAC.

Mike Kramer

RWD PT Cooling Supv.

Six Sigma Black Belt

Cell Phone: (313) 805-0190

Text Page: mkramer1

[Page from outside Ford](#), External email: mkramer1@ford.com

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ONE (7 TUBE & 8 FIN) EXTERNAL BLOCKER WITH INTERNAL COVERS

HEAT REJECTION (EFFICENCY %)		AIR VELOCITY Kg/s (m/s)		
		0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
CAHRGE AIR FLOW Kg/s (kg/hr)	0.12 (432)	46.8	55.6	59.7
	0.19 (684)	38.4	48.7	53.6
	0.28 (1037)	30.6	42.0	46.7

ΔP External AIR (Pa)	AIR VELOCITY Kg/s (m/s)		
	0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
INT. FLOW 0.288 kg/s	69.6	274.3	629.0

ΔP Internal Air (mbar)	CAHRGE AIR FLOW Kg/s (kg/hr)		
	0.12 (432)	0.19 (684)	0.28 (1037)
EXT. FLOW 1.08 kg/s	14.34	32.38	69.55

TEST CONDITIONS

9 point tests

CA Booster P = 2.0 BarA = 200 kPa-A

CA Inlet Temp = 125±1.1°C

Ambient temp.= 25°C

Face vel:

0.154 kg/s

0.62 kg/s

1.08 kg/s

CA flow: □

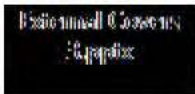
0.12 kg/s

0.19 kg/s

0.288 kg/s

From: Huang, Larry (L.)
Sent: Tuesday, May 21, 2013 1:39 PM
To: Andersen, Erik (E.)
Subject: RE: P415 Performance

The PCA data is from the drawing, and J1+7T/8F blocked was from the data that Valeo provided last week. Don't know how to explain the data. Thereticall, PCA has less total heat transfer area than J1+7T. But 7T blocking is real area reduction. PCA has a higher internal air flow speed, helping heat transfer. But what about Louvers?..Don't know how to answer.



Regards,

Larry Huang
Global Cooling/Heat Exchangers
Phone/Text Message: 313-805-2617
E-mail: lhuang3@ford.com
Building #2-3M29, Mail Drop: 1215

From: Andersen, Erik (E.)
Sent: Tuesday, May 21, 2013 1:11 PM
To: Huang, Larry (L.)
Subject: RE: P415 Performance

Is this right? I wasn't aware the 7-tube blocker dropped the effectiveness more than the PCA.

Erik Andersen
Core P/T Cooling
eanderse@ford.com
313-805-2966

From: Huang, Larry (L.)
Sent: Tuesday, May 21, 2013 12:32 PM
To: Andersen, Erik (E.)
Cc: Tyler, Jim (J.S.)
Subject: P415 Performance

Attached is P415 Performance, J1, PCA, and J1+7t/8f Blocker. Jim is helping to get ICA performance. Thank.

<< File: P415 CAC Performance_2013 5 21.pptx >>

Regards,

Larry Huang

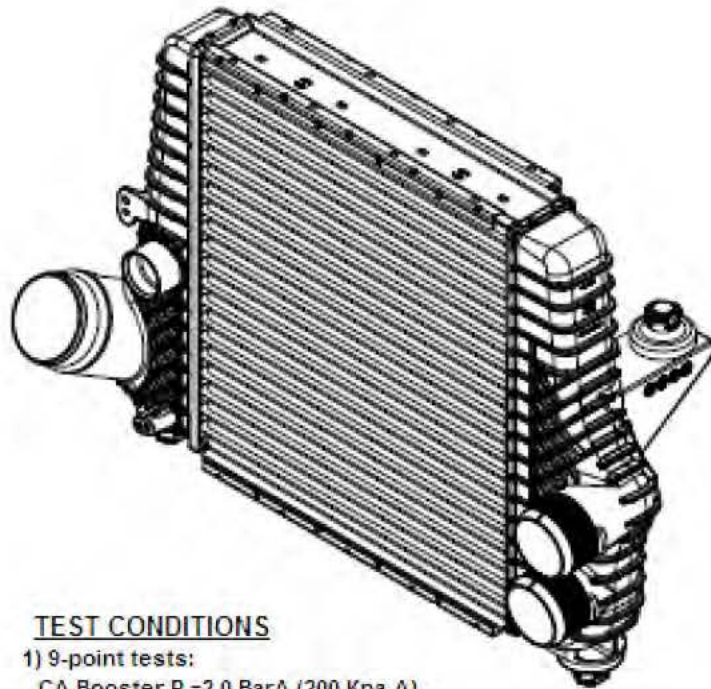
Global Cooling/Heat Exchangers

Phone/Text Message: 313-805-2617

E-mail: lhuanq3@ford.com

Building #2-3M29, Mail Drop: 1215

CAC P415 2013 (Turbulator: 14cells & with louvers) Part tested on DV



TEST CONDITIONS

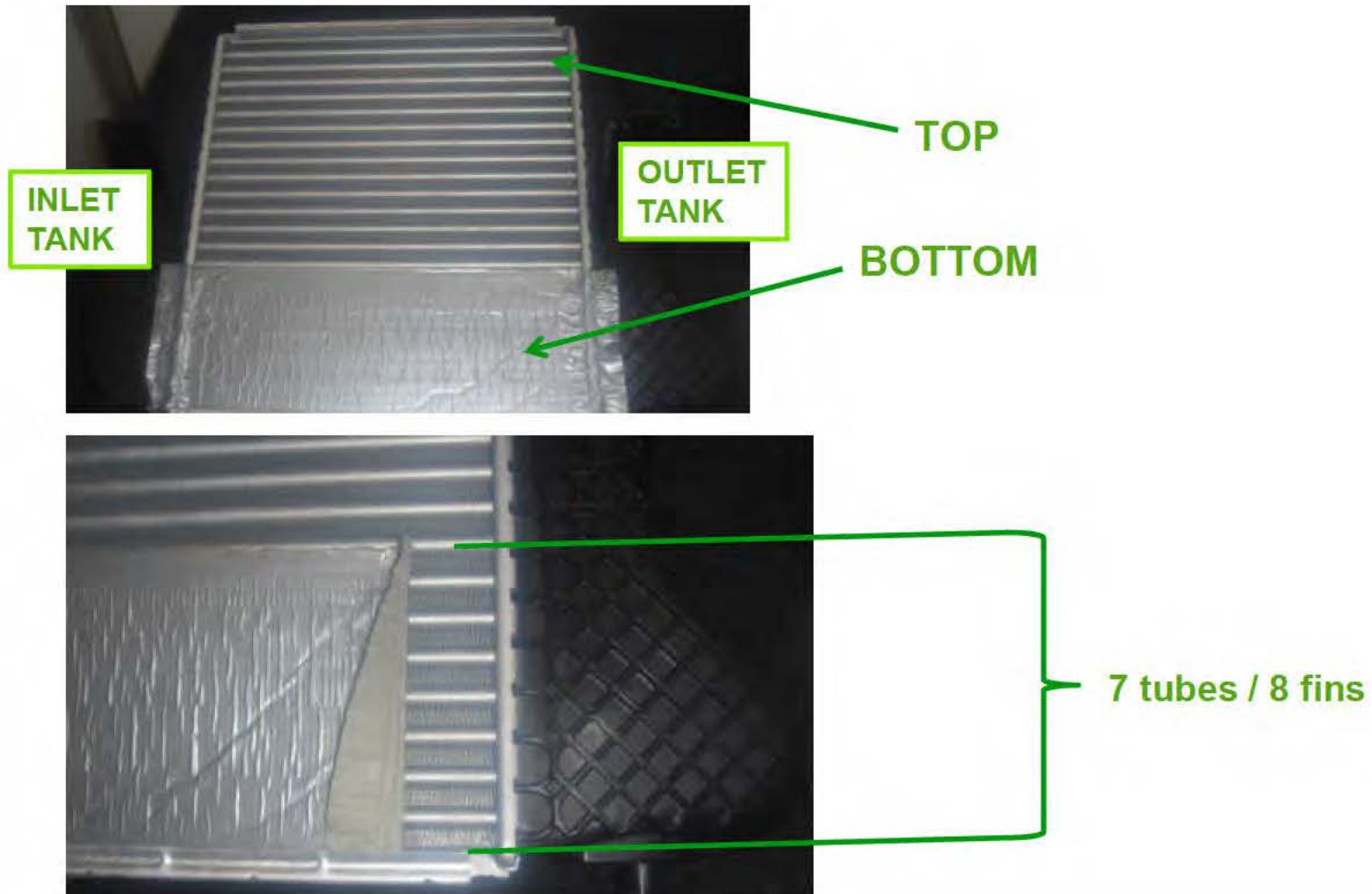
- 1) 9-point tests:
 CA Booster P = 2.0 BarA (200 Kpa-A)
 CA inlet Temp = 125 ± 1.1°C
 Amb air Temp = 25 degC
 Face vel. -
 0.81 m/s
 3.27 m/s
 5.7 m/s
 CA flow:
 432 kg/hr
 684 kg/hr
 1037 kg/hr

HEAT REJECTION (EFFICENCY %)		AIR VELOCITY Kg/s (m/s)		
		0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
CAHRGE AIR FLOW Kg/s (kg/hr)	0.12 (432)	79.5	89.9	95.9
	0.19 (684)	66.1	84.7	89.0
	0.28 (1037)	53.4	75.5	83.4

ΔP External AIR (Pa)	AIR VELOCITY Kg/s (m/s)		
	0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
INT. FLOW 0.19 kg/s	84.6	337.0	749.8

ΔP Internal Air (mbar)	CAHRGE AIR FLOW Kg/s (kg/hr)		
	0.12 (432)	0.19 (684)	0.28 (1037)
EXT. FLOW 1.08 kg/s	12.07	26.47	56.41

CAC P415 2013 (Turbulator: 14 cells & with louvers) Externally block bottom 7 tubes / 8 fins



CAC P415 2013 (Turbulator: 14 cells & with louvers)

Externally block bottom 7 tubes / 8 fins

HEAT REJECTION (EFFICIENCY %)		AIR VELOCITY Kg/s (m/s)		
		0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
CAHRGE AIR FLOW Kg/s (kg/hr)	0.12 (432)	59.6	70.4	72.5
	0.19 (684)	49.8	63.4	66.4
	0.28 (1037)	40.9	56.8	60.7

ΔP External AIR (Pa)	AIR VELOCITY Kg/s (m/s)		
	0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
INT. FLOW 0.19 kg/s	122.1	591.5	1400.8

ΔP Internal Air (mbar)	CAHRGE AIR FLOW Kg/s (kg/hr)		
	0.12 (432)	0.19 (684)	0.28 (1037)
EXT. FLOW 1.08 kg/s	11.94	26.16	54.40

TEST CONDITIONS

1) 9-point tests:

CA Booster P = 2.0 BarA (200 Kpa-A)

CA inlet Temp = 125 ± 1.1 °C

Amb air Temp = 25 degC

Face vel. -

0.81 m/s

3.27 m/s

5.7 m/s

CA flow:

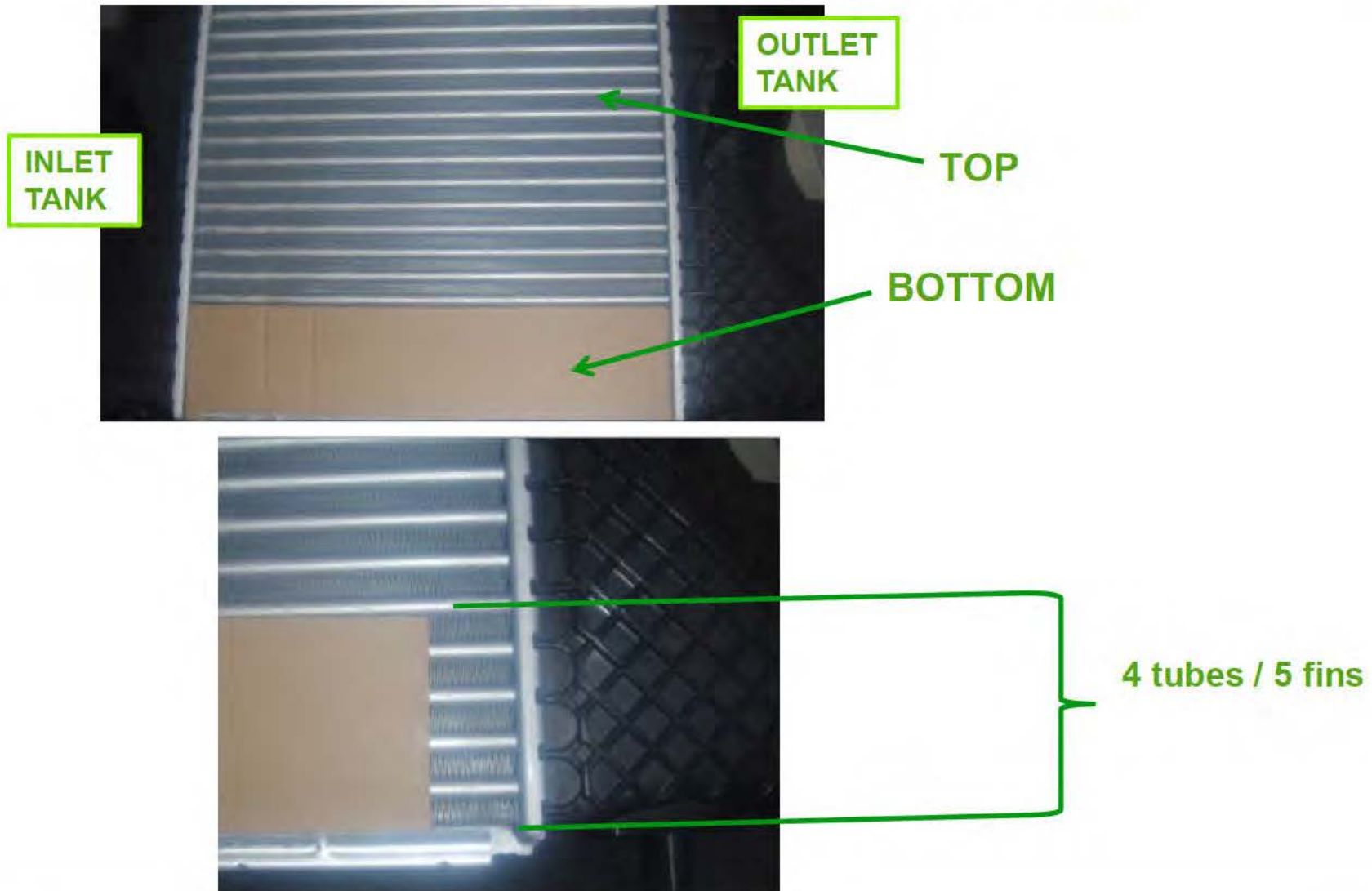
432 kg/hr

684 kg/hr

1037 kg/hr

NO INTERNAL MASK (COVER)

CAC P415 2013 (Turbulator: 14cells & with louvers) Externally block bottom 4 tubes / 5 fins



CAC P415 2013 (Turbulator: 14cells & with louvers)

Externally block bottom 4 tubes / 5 fins

HEAT REJECTION (EFFICIENCY %)		AIR VELOCITY Kgfs (m/s)		
		0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
CAHRGE AIR FLOW Kgfs (kg/hr)	0.12 (432)	71.4	83.0	85.8
	0.19 (684)	60.0	77.0	81.9
	0.28 (1037)	48.0	69.4	75.1

ΔP External AIR (Pa)	AIR VELOCITY Kgfs (m/s)		
	0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
INT. FLOW 0.3 kgfs	112.5	500.4	1140.1

ΔP Internal Air (mbar)	CAHRGE AIR FLOW Kgfs (kg/hr)		
	0.12 (432)	0.19 (684)	0.28 (1037)
EXT. FLOW 1.33 kgfs	11.60	24.08	53.18

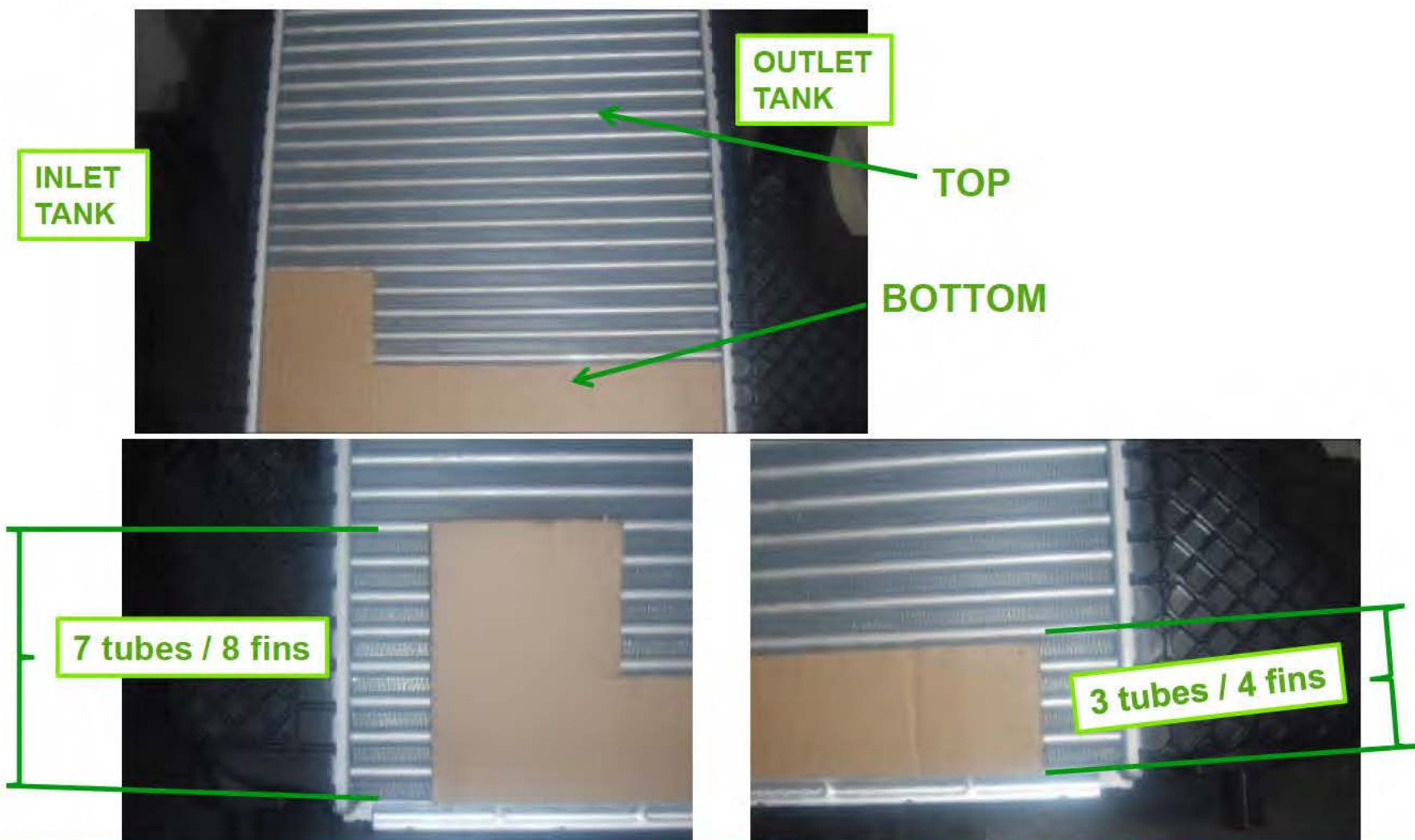
TEST CONDITIONS

- 1) 9-point tests:
 CA Booster P = 2.0 BarA (200 Kpa-A)
 CA inlet Temp = 125±1.1°C
 Amb air Temp = 25 degC
 Face vel. -
 0.81 m/s
 3.27 m/s
 5.7 m/s
 CA flow:
 432 kg/hr
 684 kg/hr
 1037 kg/hr

NO INTERNAL MASK (COVER)

CAC P415 2013 (Turbulator: 14cells & with louvers)

Externally block bottom 7 tubes / 8 fins 25% of the length across the CAC from the inlet side and the bottom 3 tubes / 4 fins the remainder of the length



CAC P415 2013 (Turbulator: 14cells & with louvers)

Externally block bottom 7 tubes / 8 fins 25% of the length across the CAC from the inlet side and the bottom 3 tubes / 4 fins the remainder of the length

HEAT REJECTION (EFFICIENCY %)		AIR VELOCITY Kg/s (m/s)		
		0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
CAHRGE AIR FLOW Kg/s (kg/hr)	0.12 (432)	69.1	81.4	85.5
	0.19 (684)	57.2	75.1	79.7
	0.28 (1037)	46.4	67.2	72.8

ΔP External AIR (Pa)	AIR VELOCITY Kg/s (m/s)		
	0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
INT. FLOW 0.19 kg/s	101.3	462.7	1071.5

ΔP Internal Air (mbar)	CAHRGE AIR FLOW Kg/s (kg/hr)		
	0.12 (432)	0.19 (684)	0.28 (1037)
EXT. FLOW 1.08 kg/s	11.82	25.81	54.36

TEST CONDITIONS

1) 9-point tests:

CA Booster P = 2.0 BarA (200 Kpa-A)

CA inlet Temp = 125 ± 1.1 °C

Amb air Temp = 25 degC

Face vel. -

0.81 m/s

3.27 m/s

5.7 m/s

CA flow:

432 kg/hr

684 kg/hr

1037 kg/hr

NO INTERNAL MASK (COVER)

From: Guillermo GUADARRAMA [guillermo.guadarrama@valeo.com]
Sent: Friday, June 15, 2012 11:07 AM
To: Kramer, Michael (M.T.)
Cc: Joseph LUMETTA; Tyler, Jim (J.S.); Larry ENGEL (larry.engel@valeo.com); David CASTILLO
Subject: Re: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM
Attachments: Performance P415 w-Maskx.pdf

Michael,

Attached you can find the values that we got from the part that is leaving this morning to Ford USA.

- One part with plastic mask of 27mm opening and trubulator (Internal Fin) with 11 cells and no louvers.

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
mail: guillermo.guadarrama@valeo.com

On Wed, Jun 13, 2012 at 3:42 PM, David CASTILLO <david.castillo@valeo.com> wrote:
Michael,

We have a leak on the part we kept at SLP on the crimping area. We are trying to seal it so we can finish the data dP today in the night.

DC.

On Wed, Jun 13, 2012 at 2:49 PM, Kramer, Michael (M.T.) <mkramer1@ford.com> wrote:

Need the component performance test data to support meetings tomorrow and need some time to review/digest before-hand. When sending?

Mike Kramer
RWD PT Cooling Supv.
Six Sigma Black Belt
Cell Phone: (313) 805-0190
Text Page: mkramer1
Page from outside Ford, External email: mkramer1@ford.com

From: Tyler, Jim (J.S.)
Sent: Wednesday, June 13, 2012 11:52 AM
To: David CASTILLO; Kramer, Michael (M.T.)

Cc: Joseph LUMETTA; Guillermo GUADARRAMA

Subject: RE: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM

David, what is the test status of the other part at SLP? Need info by today please.

Jim Tyler
T1/P552 Cooling
313-805-2565 Bld-2 23P25

From: David CASTILLO [mailto:david.castillo@valeo.com]

Sent: Tuesday, June 12, 2012 11:11 AM

To: Kramer, Michael (M.T.)

Cc: Tyler, Jim (J.S.); Joseph LUMETTA; Guillermo GUADARRAMA

Subject: Re: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM

Mike/ Jim,

We have ready the part to be ship to Ford but needs to be before noon on the truck to be with you tomorrow morning.

We will like to test the part we are going to ship to you for heat transfer as well but it will not allow us to ship it before noon so it will be with you until this Thursday morning.

Could we test it or do you prefer to ship it with no testing? There were not request to test it before ship, but we will like to do it.

Please let me know

DC.

On Fri, Jun 8, 2012 at 2:41 PM, Kramer, Michael (M.T.) <mkramer1@ford.com> wrote:

Jim, please confirm shipping location.

Mike Kramer

RWD PT Cooling Supv.

Six Sigma Black Belt

Cell Phone: (313) 805-0190

Text Page: mkramer1

Page from outside Ford, External email: mkramer1@ford.com

From: David CASTILLO [mailto:david.castillo@valeo.com]

Sent: Friday, June 08, 2012 1:02 PM

To: Kramer, Michael (M.T.)
Cc: Tyler, Jim (J.S.); Joseph LUMETTA; Guillermo GUADARRAMA

Subject: Re: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM

Ok

We will keep one piece for dP and performance base on matrix test
The other will be ship to Valeo Auburn Hill or Ford directly?

DC.

On Fri, Jun 8, 2012 at 11:46 AM, Kramer, Michael (M.T.) <mkramer1@ford.com> wrote:

Reminder. Ship one to us and keep the other at SLP to perform the performance tests per matrix provided to Joe.

Please provide test completion date.

Mike Kramer
RWD PT Cooling Supv.
Six Sigma Black Belt
Cell Phone: (313) 805-0190
Text Page: mkramer1
[Page from outside Ford, External email: mkramer1@ford.com](mailto:mkramer1@ford.com)

From: David CASTILLO [<mailto:david.castillo@valeo.com>]
Sent: Friday, June 08, 2012 11:48 AM
To: Tyler, Jim (J.S.)
Cc: Joseph LUMETTA; Guillermo GUADARRAMA; Kramer, Michael (M.T.)
Subject: Re: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM

Jim, Part will be at SLP tomorrow late today are being release by customs at Guadalajara Mexico,

We assembled them and ship them on Monday afternoon.

DC.

On Fri, Jun 8, 2012 at 10:43 AM, Tyler, Jim (J.S.) <jtyler1@ford.com> wrote:

Valeo team, what is the status of the 2 CAC builds with the 2013 Outlet tank, 11 cell no louver cores and 27mm cover plates? Are these shipping out to Ford by today, 6/8/12? Please confirm.

Jim Tyler
T1/P552 Cooling
313-805-2565 Bld-2 23P25

From: Joseph LUMETTA [mailto:joseph.lumetta@valeo.com]
Sent: Tuesday, June 05, 2012 9:27 AM
To: Tyler, Jim (J.S.)
Cc: Kramer, Michael (M.T.)
Subject: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM

Hello Jim

Just to let you know the parts are on the way to SLP Mexico.
UPS tracking #s (three packages -2 cores 11 cell louver-less and 5 27 SLS cover plates).

The tracking numbers are 1ZV4197R6741296861
1ZV4197R6741714480
1ZV4197R6740167074

Release	Schedule	Part Number	Quantity	First Req Date
2271636		DL34-9L440-0L-27MM	2	2012/06/08
Ship to FD20T, FORD RESEARCH & ENGINEERING, DEARBORN, MI US				

--
Joseph Lumetta
joseph.lumetta@valeo.com
office phone 248-209-8237
fax 248-209-8282
cell 248-709-4710

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Heat Transfer Results for CAC P415 With Mask

Version 1 June 18th, 2012

PE13-018 031267

valeo added 

PERFORMANCE RESULTS

With Mask

HEAT REJECTION (EFFICIENCY %)		AIR VELOCITY (m/s)		
		0.81	3.27	5.7
CAHR GE AIR FLOW (kg/hr)	432	70.3	84.4	87.6
	684	56.6	74.6	79.2
	1037	45.3	64.5	70.9

Spec

HEAT REJECTION (EFFICIENCY %)		AIR VELOCITY (m/s)		
		0.81	3.27	5.7
CAHR GE AIR FLOW (kg/hr)	432	73.9	88.0	91.0
	684	61.0	82.4	87.6
	1037	48.6	74.0	81.3

VARIATION DUE TO 11CELLS NO LOUVERS BETWEEN 5-15%

EXTERNAL PRESSURE DROP

ΔP External AIR (Pa)	AIR VELOCITY (m/s)		
	0.81	3.27	5.7
INT. FLOW 0.288 kg/s	62.9	264.4	602.3

ΔP External AIR (Pa)	AIR VELOCITY (m/s)		
	0.81	3.27	5.7
INT. FLOW 0.288 kg/s	70.0	314.0	704.0

INTERNAL PRESSURE DROP

ΔP Internal Air (mbar)	CAHRGE AIR FLOW (kg/hr)		
	432	684	1037
EXT. FLOW 1.08 kg/s	1.82	4.09	9.04

ΔP Internal Air (mbar)	CAHRGE AIR FLOW (kg/hr)		
	432	684	1037
EXT. FLOW 1.08 kg/s	1.37	2.99	6.11

VARIATION DUE TO 27mm COVER PLASTIC ADDITION

From: Guillermo GUADARRAMA [guillermo.guadarrama@valeo.com]
Sent: Friday, June 15, 2012 11:51 AM
To: Tyler, Jim (J.S.)
Cc: Kramer, Michael (M.T.); Joseph LUMETTA; Larry ENGEL (larry.engel@valeo.com); David CASTILLO; Eduardo BARRIOS
Subject: Re: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM
Attachments: Performance P415 w-Maskx.pdf

Mike,

The presentation that I sent before was missing the complete detail of the part that says Spec. When I say spec is current condition, averages values of 6 parts.

For the 6 tube blockers, we didn't perform that test because we don't have the tube blockers down here.

Do you want to stop the shipment to test the part when we get the tube blockers ?

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
mail: guillermo.guadarrama@valeo.com

On Fri, Jun 15, 2012 at 10:27 AM, Tyler, Jim (J.S.) <jtyler1@ford.com> wrote:
Guillermo, was this test data conducted with the external front CAC air cover in place also? Please confirm.

Jim Tyler
T1/P552 Cooling
313-805-2565 Bld-2 23P25

From: Guillermo GUADARRAMA [mailto:guillermo.guadarrama@valeo.com]
Sent: Friday, June 15, 2012 11:07 AM
To: Kramer, Michael (M.T.)
Cc: Joseph LUMETTA; Tyler, Jim (J.S.); Larry ENGEL (larry.engel@valeo.com); David CASTILLO
Subject: Re: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM

Michael,

Attached you can find the values that we got from the part that is leaving this morning to Ford USA.

- One part with plastic mask of 27mm opening and trubulator (Internal Fin) with 11 cells and no louvers.

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
mail: guillermo.guadarrama@valeo.com

On Wed, Jun 13, 2012 at 3:42 PM, David CASTILLO <david.castillo@valeo.com> wrote:
Michael,

We have a leak on the part we kept at SLP on the crimping area. We are trying to seal it so we can finish the data dP today in the night.

DC.

On Wed, Jun 13, 2012 at 2:49 PM, Kramer, Michael (M.T.) <mkramer1@ford.com> wrote:

Need the component performance test data to support meetings tomorrow and need some time to review/digest before-hand. When sending?

Mike Kramer
RWD PT Cooling Supv.
Six Sigma Black Belt
Cell Phone: (313) 805-0190
Text Page: mkramer1
Page from outside Ford, External email: mkramer1@ford.com

From: Tyler, Jim (J.S.)
Sent: Wednesday, June 13, 2012 11:52 AM
To: David CASTILLO; Kramer, Michael (M.T.)

Cc: Joseph LUMETTA; Guillermo GUADARRAMA
Subject: RE: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM

David, what is the test status of the other part at SLP? Need info by today please.

Jim Tyler
T1/P552 Cooling
313-805-2565 Bld-2 23P25

From: David CASTILLO [mailto:david.castillo@valeo.com]
Sent: Tuesday, June 12, 2012 11:11 AM
To: Kramer, Michael (M.T.)
Cc: Tyler, Jim (J.S.); Joseph LUMETTA; Guillermo GUADARRAMA
Subject: Re: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM

Mike/ Jim,

We have ready the part to be ship to Ford but needs to be before noon on the truck to be with you tomorrow morning.
We will like to test the part we are going to ship to you for heat transfer as well but it will not allow us to ship it before noon so it will be with you until this Thursday morning.
Could we test it or do you prefer to ship it with no testing? There were not request to test it before ship, but we will like to do it.

Please let me know

DC.

On Fri, Jun 8, 2012 at 2:41 PM, Kramer, Michael (M.T.) <mkramer1@ford.com> wrote:

Jim, please confirm shipping location.

Mike Kramer
RWD PT Cooling Supv.
Six Sigma Black Belt
Cell Phone: (313) 805-0190
Text Page: mkramer1
Page from outside Ford. External email: mkramer1@ford.com

From: David CASTILLO [mailto:david.castillo@valeo.com]
Sent: Friday, June 08, 2012 1:02 PM
To: Kramer, Michael (M.T.)
Cc: Tyler, Jim (J.S.); Joseph LUMETTA; Guillermo GUADARRAMA

Subject: Re: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM

Ok

We will keep one piece for dP and performance base on matrix test
The other will be ship to Valeo Aurburn Hill or Ford directly?

DC.

On Fri, Jun 8, 2012 at 11:46 AM, Kramer, Michael (M.T.) <mkramer1@ford.com> wrote:

Reminder. Ship one to us and keep the other at SLP to perform the performance tests per matrix provided to Joe.

Please provide test completion date.

Mike Kramer

RWD PT Cooling Supv.

Six Sigma Black Belt

Cell Phone: (313) 805-0190

Text Page: mkramer1

Page from outside Ford, External email: mkramer1@ford.com

From: David CASTILLO [<mailto:david.castillo@valeo.com>]

Sent: Friday, June 08, 2012 11:48 AM

To: Tyler, Jim (J.S.)

Cc: Joseph LUMETTA; Guillermo GUADARRAMA; Kramer, Michael (M.T.)

Subject: Re: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM

Jim, Part will be at SLP tomorrow late today are being release by customs at Guadalajara Mexico,

We assembled them and ship them on Monday afternoon.

DC.

On Fri, Jun 8, 2012 at 10:43 AM, Tyler, Jim (J.S.) <jtyler1@ford.com> wrote:

Valeo team, what is the status of the 2 CAC builds with the 2013 Outlet tank, 11 cell no louver cores and 27mm cover plates? Are these shipping out to Ford by today, 6/8/12? Please confirm.

Jim Tyler

T1/P552 Cooling

313-805-2565 Bld-2 23P25

From: Joseph LUMETTA [<mailto:joseph.lumetta@valeo.com>]

Sent: Tuesday, June 05, 2012 9:27 AM

To: Tyler, Jim (J.S.)

Cc: Kramer, Michael (M.T.)

Subject: Parts shipped to Valeo SLP Mexico for the DL34-9L440-0L-27MM

Hello Jim

Just to let you know the parts are on the way to SLP Mexico.

UPS tracking #s (three packages -2 cores 11 cell louver-less and 5 27 SLS cover plates).

The tracking numbers are 1ZV4197R6741296861

1ZV4197R6741714480

1ZV4197R6740167074

<u>Release</u>	<u>Schedule</u>	<u>Part Number</u>	<u>Quantity</u>	<u>First Req Date</u>
2271636		DL34-9L440-0L-27MM	2	2012/06/08
Ship to FD20T, FORD RESEARCH & ENGINEERING, DEARBORN, MI US				

--

Joseph Lumetta

joseph.lumetta@valeo.com

office phone 248-209-8237

fax 248-209-8282

cell 248-709-4710

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Heat Transfer Results for CAC P415 With Mask

Version 1 June 18th, 2012

PE13-018 031276

valeo added 

PERFORMANCE RESULTS

With Mask

HEAT REJECTION (EFFICIENCY %)		AIR VELOCITY (m/s)		
		0.81	3.27	5.7
CAHR GE AIR FLOW (kg/hr)	432	70.3	84.4	87.6
	684	56.6	74.6	79.2
	1037	45.3	64.5	70.9

Current Condition
(Spec Showed on Drawing)

HEAT REJECTION (EFFICIENCY %)		AIR VELOCITY (m/s)		
		0.81	3.27	5.7
CAHR GE AIR FLOW (kg/hr)	432	73.9	88.0	91.0
	684	61.0	82.4	87.6
	1037	48.6	74.0	81.3

VARIATION DUE TO 11CELLS NO LOUVERS BETWEEN 5-15%

EXTERNAL PRESSURE DROP

With Mask

ΔP External Air (Pa)	AIR VELOCITY (m/s)		
	0.81	3.27	5.7
INT. FLOW 0.288 kg/s	62.9	264.4	602.3

Current Condition
(Spec Showed on Drawing)

ΔP External Air (Pa)	AIR VELOCITY (m/s)		
	0.81	3.27	5.7
INT. FLOW 0.288 kg/s	70.0	314.0	704.0

INTERNAL PRESSURE DROP

With Mask

ΔP Internal Air (mbar)	CAHRGE AIR FLOW (kg/hr)		
	432	684	1037
EXT. FLOW 1.08 kg/s	1.82	4.09	9.04

Current Condition
(Spec Showed on Drawing)

ΔP Internal Air (mbar)	CAHRGE AIR FLOW (kg/hr)		
	432	684	1037
EXT. FLOW 1.08 kg/s	1.37	2.99	6.11

VARIATION DUE TO 27mm COVER PLASTIC ADDITION

From: Guillermo GUADARRAMA [guillermo.guadarrama@valeo.com]
Sent: Friday, November 23, 2012 12:11 PM
To: Tyler, Jim (J.S.)
Cc: Blas-Fernando GUTIERREZ; Kramer, Michael (M.T.); Allan, Valerie (V.J.)
Subject: Re: Pre PV test for 2nd Cover Assembly - CAC P415
Attachments: PVP&R CAC P415 NEW CAC eCBV Ford Hystorical changes_Flairing Machine 2.pdf;
ALERT A12633189 REV1.pptx

Jim,

Attached you can find the Pre-PV finished and the Alert for your approval.

Thanks,

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
mail: guillermo.guadarrama@valeo.com

On Tue, Nov 20, 2012 at 12:40 PM, Tyler, Jim (J.S.) <jtyler1@ford.com> wrote:

Hi Blas, welcome back to P415 activities. The SREA 20121026024 for this 2nd tube cover installer has been reviewed and approved by Val Allan and Mike Kramer, and awaiting our manager and chief approval.

Please confirm if the Use Alert will be written from Valeo's end.

Jim Tyler
T1/P552 Cooling
313-805-2565 Bld-2 23P25

From: Blas-Fernando GUTIERREZ [mailto:blas-fernando.gutierrez@valeo.com]
Sent: Tuesday, November 20, 2012 12:31 PM
To: Tyler, Jim (J.S.)
Cc: Guillermo GUADARRAMA
Subject: Pre PV test for 2nd Cover Assembly - CAC P415

Hi Jim,

I hope you are fine. I am back to follow P415 activities as David Castillo is being assigned for some other

activities...I am looking for your support to to review if the plan I have can be supported with with your approval for an ALERT...

We have the second cover assembly machine for P415 to support capacity Increases. We are going to validate this station for PPAP with STA by Nov 29th and from there we will run a PV Testing.

As we have to start using that machine to verify we are ready to run on the R&R I am trying to produce on that assembly station about 600 Core Assembly before we go to the R&R, this to allow also the operator to reach the required speed on the operation, the problem is that requirements are high for shipments then I am trying use an ALERT to permit us to ship the material we will be assembling on the Cover assembly station #2.

In order to verify that parts are OK, we propose you to run a PRE PV only to support the ALERT, including a flow blow test (2pcs) and cover extraction on 6 samples..

Please confirm if you could agree on the plan then we would provide you a PRE PV for ALERT support to permit us to produce and Ship parts with out PSW from Cover assembly #2...

Thanks in advance for your support..

Blas Gutierrez

Project Manager

blas-fernando.utierrez@valeo.com

Tel. +52 444 8 26 66 12

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PRODUCT VALIDATION PLAN & REPORT

OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eCBV, 57MA proposal

PLM control:	PVPAR No	PV12 134	REVISION No:	11
EDM:	ORIGIN DATE:	27 May 11	DATE REV:	20 Nov 12
PPCR #:	APPROVAL:			
PPDR #:	RD Manager / R. Sanchez	Signed by Site Manager / R. Ariles		
CUSTOMER APPROVAL:		Project Manager or Change Leader		
NAME		Date		
PTP's Coordinator / E. Barrios		Other: /		
Testing Lab / J.A.R&K or Home U				

MODEL YEARS:	COMPONENT / ASSY:	VALEO P.N.	DRAWING & REV	SUPPLIER NAME:
2013	Charger Cooler (CAC)	M165170	100046940 REV A	Valeo Termico
PROJECT APPLICATION (S)	CUSTOMER:	CUSTOMER P.N.	ASSEMBLY PLANT:	ORIGINATOR:
FORD F Series GTDI	FORD		VEC SLP	GUILLERMO GUADARRAMA

TM	PROCEDURE STANDARD	TEST DESCRIPTION	TEST FACILITY	ACCEPTANCE CRITERIA	TARGET REQUIRED	TST STAGE	SAMPLES		TARGET		ACTUAL RESULT		NOTES / SUMMARY RESULTS / ACTIONS
							QTY	TYPE	START (dd/mm/aa)	COMPLETED (dd/mm/aa)	QTY	TYPE	

BL34-9L440-AC, Baseline
 New Part number DL34-9L440-AB
 INTERIM - PV (PV12-099)
 WPTS E 12495488 000

NON FUNCTIONAL TESTING															
1	CPS 0032 III A Class A	LEAK TEST Test cond time Test pressure: 207±14 kPa (g) Test time: 20 sec (for prototype stage) Test medium: ambient compressed air	Valeo SLP	VALIDATION CAC P415 GTDI, 57MA proposal (Plastic tanks)	PASS 100%	PV	ALL	D	30 Jun 12	30 Jun 12	ALL	D	OK	N/A	LEAK CHECKED ON EOL

FUNCTIONAL TEST AND RESTRICTIONS																																																																							
2	CPS 0032, IV A Class A	HEAT TRANSFER Chargeside Q: 0.288 Kg/s (50% On each port) Charge air inlet temp: -125±1 °C Charge air inlet pressure: 200 Kpa A Ambient temp: 25°C Air Speed: (5.7 m/s) 1.08 Kg/s The test has to be performed with the muffler assembly (O Ring + valve + Muffler)	Valeo SLP	Performance operation point 0.288 Kg/s/1.07 Kg/s CAC Efficiency TBD % ± 5% Maximum Internal Pressure Drop TBD kPa ± 10% g point matrix to be printed on the drawing, CAC Efficiency and pressure drop Coding air flow: 0.154, 0.62, 1.08 kg/s Charge Air Flow: 0.12, 0.19 & 0.288 kg/s	PASS 100%	PV	5	D	2 Jun 12	7 Jun 12	5	D	OK	TR 5254	<p>* PERFORMANCE COMPARISON OR DEGRADATION MUST BE COMPARED vs BASELINE BL34-9L440-AB. * AVERAGE RESULTS FROM 5 SAMPLES TESTED</p> <table border="1"> <caption>BL34-9L440-AB</caption> <thead> <tr> <th rowspan="2">CHARGE AIR PRESSURE: 1.0 bar (g)</th> <th colspan="3">COOLING AIR FLOW (kg/s)</th> <th rowspan="2">CHARGE AIR FLOW (kg/s)</th> </tr> <tr> <th>0.154</th> <th>0.62</th> <th>1.08</th> </tr> </thead> <tbody> <tr> <th>0.12</th> <td>72.8</td> <td>60.2</td> <td>61.8</td> <td>1.02</td> </tr> <tr> <th>0.19</th> <td>80.0</td> <td>81.1</td> <td>87.6</td> <td>1.28</td> </tr> <tr> <th>0.288</th> <td>40.4</td> <td>74.3</td> <td>81.3</td> <td>6.0</td> </tr> <tr> <th>P External (kPa(a))</th> <td>70.9</td> <td>136.1</td> <td>100.0</td> <td></td> </tr> </tbody> </table> <table border="1"> <caption>DL34-9L440-AB</caption> <thead> <tr> <th rowspan="2">CHARGE AIR PRESSURE: 1.0 bar (g)</th> <th colspan="3">COOLING AIR FLOW (kg/s)</th> <th rowspan="2">CHARGE AIR FLOW (kg/s)</th> </tr> <tr> <th>0.154</th> <th>0.62</th> <th>1.08</th> </tr> </thead> <tbody> <tr> <th>0.12</th> <td>72.8</td> <td>60.2</td> <td>61.8</td> <td>1.02</td> </tr> <tr> <th>0.19</th> <td>80.0</td> <td>81.1</td> <td>87.6</td> <td>1.28</td> </tr> <tr> <th>0.288</th> <td>40.4</td> <td>74.3</td> <td>81.3</td> <td>6.0</td> </tr> <tr> <th>P External (kPa(a))</th> <td>44.1</td> <td>124.8</td> <td>104.1</td> <td></td> </tr> </tbody> </table>	CHARGE AIR PRESSURE: 1.0 bar (g)	COOLING AIR FLOW (kg/s)			CHARGE AIR FLOW (kg/s)	0.154	0.62	1.08	0.12	72.8	60.2	61.8	1.02	0.19	80.0	81.1	87.6	1.28	0.288	40.4	74.3	81.3	6.0	P External (kPa(a))	70.9	136.1	100.0		CHARGE AIR PRESSURE: 1.0 bar (g)	COOLING AIR FLOW (kg/s)			CHARGE AIR FLOW (kg/s)	0.154	0.62	1.08	0.12	72.8	60.2	61.8	1.02	0.19	80.0	81.1	87.6	1.28	0.288	40.4	74.3	81.3	6.0	P External (kPa(a))	44.1	124.8	104.1	
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3	CPS 0032, IV E Class B (See exception)	HOT PRESSURE CYCLE Cycle pressure: 0 to 150 kPa g ± 21 Kpa, instead of 210 KPa Charge air inlet Temperature: 18.5Ca5°C instead of 205Ca5°C Test Medium: Compressed Air Cycle Rate: 50 cycles/min (± 10 Cycles/min) The test has to be performed with the muffler assembly provided by FORD.	Valeo SLP	375,000 MINIMUM CYCLES to pass the test specification	PASS 100%	PV	4	D	31 May 12	6 Jun 12	4	D	OK	TR 5252	<table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>Minimum of Cycles</th> <th>TOTAL CYCLES TESTED</th> <th>OBSERVATIONS</th> </tr> </thead> <tbody> <tr> <td>LB121353</td> <td>0.0</td> <td>375,000</td> <td>NO LEAKS WERE DETECTED DURING THE TESTING</td> </tr> <tr> <td>LB121354</td> <td>0.0</td> <td>375,000</td> <td>NO LEAKS WERE DETECTED DURING THE TESTING</td> </tr> <tr> <td>LB121278</td> <td>0.0</td> <td>375,000</td> <td>NO LEAKS WERE DETECTED DURING THE TESTING</td> </tr> <tr> <td>LB121280</td> <td>0.0</td> <td>375,000</td> <td>NO LEAKS WERE DETECTED DURING THE TESTING</td> </tr> </tbody> </table>	SAMPLE ID	Minimum of Cycles	TOTAL CYCLES TESTED	OBSERVATIONS	LB121353	0.0	375,000	NO LEAKS WERE DETECTED DURING THE TESTING	LB121354	0.0	375,000	NO LEAKS WERE DETECTED DURING THE TESTING	LB121278	0.0	375,000	NO LEAKS WERE DETECTED DURING THE TESTING	LB121280	0.0	375,000	NO LEAKS WERE DETECTED DURING THE TESTING																																				
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4	CPS 0032, IV G Class A	PROOF PRESSURE / BURST Pressure: 300 Kpa ± 21 Kpa Ramp Time: 10 sec ± 3.0 sec Hold time: 1min 30 sec Test Medium: Water Test Medium: Water	Valeo SLP	RECORD Sample CAC must meet the acceptance requirement. For leak test III A No fit collapse or tube deformation before 300 Kpa Test acceleration/Burst Increased pressure at a slow rate until leakage occurs	PASS 100%	PV	5	D	8 Jun 12	11 Jun 12	5	D	OK	TR 5251	<table border="1"> <thead> <tr> <th>Sample</th> <th>Leak @ 300 kPa (base)</th> <th>Burst Pressure (kPa / PSI)</th> <th>Observations</th> </tr> </thead> <tbody> <tr> <td>LB121315</td> <td>OK</td> <td>682 / 99</td> <td>LEAK ON CRIMPING, OUTLET TANK</td> </tr> <tr> <td>LB121316</td> <td>OK</td> <td>738 / 107</td> <td>TOTAL DETACHMENT OUTLET TANK</td> </tr> <tr> <td>LB121317</td> <td>OK</td> <td>676 / 98</td> <td>LEAK ON CRIMPING, OUTLET TANK</td> </tr> <tr> <td>LB121318</td> <td>OK</td> <td>662 / 96</td> <td>LEAK ON CRIMPING, OUTLET TANK</td> </tr> <tr> <td>LB121319</td> <td>OK</td> <td>772 / 112</td> <td>LEAK ON CRIMPING, OUTLET TANK</td> </tr> </tbody> </table>	Sample	Leak @ 300 kPa (base)	Burst Pressure (kPa / PSI)	Observations	LB121315	OK	682 / 99	LEAK ON CRIMPING, OUTLET TANK	LB121316	OK	738 / 107	TOTAL DETACHMENT OUTLET TANK	LB121317	OK	676 / 98	LEAK ON CRIMPING, OUTLET TANK	LB121318	OK	662 / 96	LEAK ON CRIMPING, OUTLET TANK	LB121319	OK	772 / 112	LEAK ON CRIMPING, OUTLET TANK																																
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5	CPS 0032, IV G Class B (See exception)	HOY AGE TEST Chamber Temperature: 155°C ± 5.0°C, instead of 205 °C	Valeo SLP	The CAC shall not develop a crimp or tank leakage that exceed a leak rate of 500 cc/min at 207 kPa after enduring min. time requirement Minimum life Inlet side: 200 hrs Minimum life Outlet side: 75 hrs	PASS 100%	PV	2	D	25 May 12	11 Jun 12	2	D	OK	TR 5253	<table border="1"> <thead> <tr> <th>Sample</th> <th>200 Hours (Inlet side)</th> <th>75 Hours (Outlet side)</th> <th>Leak Rate after testing (500 cc/min max)</th> <th>Observations</th> </tr> </thead> <tbody> <tr> <td>LB121281</td> <td>OK</td> <td>OK</td> <td>480 cc/min</td> <td>Leak on crimping outlet tank below the maximum allowed.</td> </tr> <tr> <td>LB121282</td> <td>OK</td> <td>OK</td> <td>6.8 cc/min</td> <td>No leaks detected during or after testing</td> </tr> </tbody> </table>	Sample	200 Hours (Inlet side)	75 Hours (Outlet side)	Leak Rate after testing (500 cc/min max)	Observations	LB121281	OK	OK	480 cc/min	Leak on crimping outlet tank below the maximum allowed.	LB121282	OK	OK	6.8 cc/min	No leaks detected during or after testing																																									
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BL34-9L440-AC, Baseline
 New Part number DL34-9L440-AB (PV11-081)
 WPTS E 12495488 000

NON FUNCTIONAL TESTING															
1	CPS 0032 III A Class A	LEAK TEST Test cond time Test pressure: 207±14 kPa (g) Test time: 20 sec (for prototype stage) Test medium: ambient compressed air	Valeo SLP	VALIDATION CAC P415 GTDI, 57MA proposal (Plastic tanks)	PASS 100%	PV	ALL	D	9 Jul 12	9 Jul 12	20	D	OK	N/A	Sample matrix leak test on EOL, adjusted to 3.9 Kpa

PE13-018 031281



PRODUCT VALIDATION PLAN & REPORT

CONFIDENTIAL

OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eCBV, 57MA proposal

PLM control:	PVPAR No	PV12 134	REVISION No:	11
EDM:	ORIGIN DATE:	27 May 11	DATE REV:	20 Nov 12
PPCR #:	APPROVAL:			
PPDR #:	RD Manager / R. Sanchez	Signed by Site Manager / R. Ariles		
	PTP's Coordinator / E. Barrios	Project Manager or Change Leader		
	Testing Lab / J.A.R&R or Home U	Other: /		

MODEL YEARS:	COMPONENT / ASSY:	VALEO P/N	DRAWING & REV	SUPPLIER NAME:	CUSTOMER APPROVAL:	
2013	Charger Cooler (CAC)	M165170	100046940 REV A	Valeo Termico	NAME	SGN DATE
PROJECT APPLICATION (S)	CUSTOMER:	CUSTOMER P/N	ASSEMBLY PLANT:	ORIGINATOR:		
FORD F Series GTDI	FORD		VEC SLP	GUILERMO GUADARRAMA		

2	CPS 0032 III B Class A	INTERNAL CLEANLINESS <i>(Surrogate data from BL34 9L440 AB)</i> Test description: Measure the internal cleanliness per SAE J1726, air to air CAC Filter size: 1µm	Valeo SLP	CAC must meet internal surface SAE J1726 requirements: Max weight: 25 mg Maximum particle size: 3 175 nm Maximum particle area: 2.06 mm ² non ferrous metal particle size < 0.65mm, sand < 0.3mm	PASS 100%	PV	2	D	22 Oct 10	25 Oct 12	2	D	OK	TR 4743	Data surrogate from BL34 9L440 AB Max weight: Sample 1 > 12.3 mg, Sample 2 > 17.9 mg Maximum particle size: Sample 1 > 0.432 mm, Sample 2 > 0.347 mm Maximum particle area: Sample 1 > 0.2349 mm ² , Sample 2 > 0.5483 mm ²
3	CPS 0032 III C Class A	INTERNAL VOLUME	Valeo SLP	RECORD	N/A	PV	2	D	20 Jul 12	20 Jul 12	2	D	OK	TR 9291	VOLUME (cm ³) SAMPLE 1 7900 SAMPLE 2 7900
4	CPS 0032 III D Class A	WEIGHT Core weight, including tubes, inlet fins, side plates, headers total weight core plus inlet/outlet tanks	Valeo SLP	RECORD	N/A	PV	2	D	20 Jul 12	20 Jul 12	2	D	OK	TR 9291	WEIGHT (gr) SAMPLE 1 3808 SAMPLE 2 3808

FUNCTIONAL TEST AND RESTRICTIONS

5	CPS 0032 IV A Class A	HEAT TRANSFER Charge side Q' 0.288 Kg/s (50% On each port) Charge inlet temp 125±1 °C Charge air inlet pressure 200 Kpa A Ambient temp 25°C Air Speed (5 7 m/s) 1.08 Kg/s The test has to be performed with the muffler assembly (O Ring + valve + Muffler)	Valeo SLP	Performance operation point 0.288 Kg/s/1.07 Kg/s CAC Effectiveness 91.4 % ± 5% Maximum Internal Pressure Drop 5.91 kPa ± 10% 9 point matrix to be printed on the drawing, CAC Effectiveness and pressure drop Coding air flow 0.154, 0.62, 1.08 kg/s Charge Air Flow 0.12, 0.19 & 0.288 kg/s	PASS 100%	PV	5	D	17 Jul 12	20 Jul 12	5	D	OK	TR 5304	* PERFORMANCE COMPARISON OR DEGRADATION MUST BE COMPARED vs BASELINE BL34 9L440 AB * AVERAGE RESULTS FROM 5 SAMPLES TESTED <table border="1"> <tr> <th colspan="2">HEAT REJECTION (EFFICIENCY %)</th> <th colspan="3">AIR VELOCITY (m/s)</th> </tr> <tr> <td colspan="2"></td> <td>4.61</td> <td>3.27</td> <td>5.7</td> </tr> <tr> <th rowspan="2">CASH / SE AIR FLOW (kg/h)</th> <td>432</td> <td>76.2</td> <td>85.5</td> <td>10.5</td> </tr> <tr> <td>698</td> <td>12.1</td> <td>12.0</td> <td>10.0</td> </tr> <tr> <td>897</td> <td>10.0</td> <td>74.0</td> <td>10.4</td> <td></td> </tr> </table> <table border="1"> <tr> <th rowspan="2">JP (m³/min)</th> <th colspan="3">AIR VELOCITY (m/s)</th> </tr> <tr> <td>9.81</td> <td>3.27</td> <td>5.7</td> </tr> <tr> <th rowspan="2">EXT FLOW 100 kg/h</th> <td>12.0</td> <td>24.07</td> <td>40.9</td> </tr> </table>	HEAT REJECTION (EFFICIENCY %)		AIR VELOCITY (m/s)					4.61	3.27	5.7	CASH / SE AIR FLOW (kg/h)	432	76.2	85.5	10.5	698	12.1	12.0	10.0	897	10.0	74.0	10.4		JP (m³/min)	AIR VELOCITY (m/s)			9.81	3.27	5.7	EXT FLOW 100 kg/h	12.0	24.07	40.9
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	6	CPS 0032 IV E Class B (See exception)	HOT PRESSURE CYCLE Cycle pressure 0 to 150 kPa g ± 21 Kpa, instead of 210 Kpa Charge Inlet Temperature 205 Ca5 0°C Test Medium Compressed Air Cycle Rate 50 cycles/min (± 10 Cycles/min) The test has to be performed with the muffler assembly provided by FORD	Valeo GREEN	375,000 MINIMUM CYCLES to pass the test specification	PASS 100%	PV	4	D	13 Jul 12	24 Jul 12	4	D	OK	GB 120052	REPORT UNDER CREATION <table border="1"> <tr> <th>SAMPLE ID</th> <th>Minimum of Cycles</th> <th>LEAK RATE</th> <th>OBSERVATIONS</th> </tr> <tr> <td>10584</td> <td>375 000</td> <td>0 cm</td> <td>No Leak Detected</td> </tr> <tr> <td>10584</td> <td>Set factory</td> <td>0 cm</td> <td>No Leak Detected</td> </tr> <tr> <td>10584</td> <td>Set factory</td> <td>0 cm</td> <td>0 psi LOSS SMALL CRIMP LEAK DS TOP OR LLS SIDE</td> </tr> <tr> <td>10584</td> <td>Set factory</td> <td>0 cm</td> <td>0 psi LOSS SMALL CRIMP LEAK DS MIDDLE ENGINE SIDE</td> </tr> </table>	SAMPLE ID	Minimum of Cycles	LEAK RATE	OBSERVATIONS	10584	375 000	0 cm	No Leak Detected	10584	Set factory	0 cm	No Leak Detected	10584	Set factory	0 cm	0 psi LOSS SMALL CRIMP LEAK DS TOP OR LLS SIDE	10584	Set factory	0 cm	0 psi LOSS SMALL CRIMP LEAK DS MIDDLE ENGINE SIDE														
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7	CPS 0032 IV F Class C (See exception)	THERMAL CYCLE <i>(Surrogate data from BL34 9L440 AB)</i> Cold charge air temp 30±0°C Hot charge temp 145.0 ± 5.0°C Charge air flow (cold/hot) 1.6 ± 2.5 Kg/min Cycle rate (equal hot & cold) 30 ± 2.0 cycles/hour Ambient air face velocity 2 ± 0.5 m/s Ambient Air Temperature 30 ± 1°C	Valeo SLP	5,000 MINIMUM CYCLES to pass the test specification	PASS 100%	PV	2	D	18 Oct 10	29 Oct 10	2	D	OK	TR 4342	Data surrogate from BL34 9L440 AB After 7,500 cycles the test was proceeded by turning off the ambient airflow, and continued up to 8,000 cycles. At 8,000 cycle a leak test was performed and no leaks detected. Test was stopped at the end of 8,000 cycles																																			
8	CPS 0032 IV G Class A	PROOF PRESSURE / BURST Pressure 300 Kpa ± 21 kPa Ramp Time 10 sec ± 0.5 sec Hold time Min 30 sec Test Medium Water Test Medium Water The test has to be performed with the muffler assembly	Valeo SLP	RECORD Sample CAC must meet the acceptance requirement. For leak test III A No in collapse or tube deformation before 300 Kpa Test acceleration/Burst Increased pressure at slow rate until leakage occurs	PASS 100%	PV	5	D	18 Jul 12	19 Jul 12	5	D	OK	TR 5302	<table border="1"> <tr> <th>Sample</th> <th>Leak @ 300 kPa (Flow)</th> <th>Baral Pressure (Pa / PSI)</th> <th>Observations</th> </tr> <tr> <td>LB121783</td> <td>OK</td> <td>718 / 103</td> <td>LEAK ON CRIMPING OUTLET TANK</td> </tr> <tr> <td>LB121784</td> <td>OK</td> <td>728 / 107</td> <td>LEAK ON CRIMPING OUTLET TANK</td> </tr> <tr> <td>LB121785</td> <td>OK</td> <td>758 / 110</td> <td>LEAK ON CRIMPING OUTLET TANK</td> </tr> <tr> <td>LB121786</td> <td>OK</td> <td>793 / 115</td> <td>LEAK ON CRIMPING OUTLET TANK</td> </tr> <tr> <td>LB121787</td> <td>OK</td> <td>758 / 110</td> <td>LEAK ON CRIMPING OUTLET TANK</td> </tr> </table>	Sample	Leak @ 300 kPa (Flow)	Baral Pressure (Pa / PSI)	Observations	LB121783	OK	718 / 103	LEAK ON CRIMPING OUTLET TANK	LB121784	OK	728 / 107	LEAK ON CRIMPING OUTLET TANK	LB121785	OK	758 / 110	LEAK ON CRIMPING OUTLET TANK	LB121786	OK	793 / 115	LEAK ON CRIMPING OUTLET TANK	LB121787	OK	758 / 110	LEAK ON CRIMPING OUTLET TANK											
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LB121787	OK	758 / 110	LEAK ON CRIMPING OUTLET TANK																																															
9	CPS 0032 IV G Class B (See exception)	HOT AGE TEST Chamber Temperature 165°C ± 5 °C, instead of 205 °C The test has to be performed with the muffler assembly provided by FORD (O Ring + valve + Muffler)	Valeo SLP	The CAC shall not develop a crimp or tank leakage that exceeded a leak rate of 500 ccm/min at 207 kPa after enduring min. time requirement Minimum life Inlet side 200 hrs Minimum life Outlet side 75 hrs	PASS 100%	PV	2	D	16 Jul 12	30 Jul 12	2	D	OK	TR 5312	<table border="1"> <tr> <th>SAMPLE ID</th> <th>209 HOURS (INLET SIDE)</th> <th>75 HOURS (OUTLET SIDE)</th> <th>TOTAL OF HOURS</th> <th>LEAK RATE</th> <th>COMMENTS</th> </tr> <tr> <td>LB121793</td> <td>OK</td> <td>OK</td> <td>281</td> <td>0.0</td> <td>NO LEAKS DETECTED</td> </tr> <tr> <td>LB121794</td> <td>OK</td> <td>OK</td> <td>281</td> <td>0.0</td> <td>NO LEAKS DETECTED</td> </tr> </table>	SAMPLE ID	209 HOURS (INLET SIDE)	75 HOURS (OUTLET SIDE)	TOTAL OF HOURS	LEAK RATE	COMMENTS	LB121793	OK	OK	281	0.0	NO LEAKS DETECTED	LB121794	OK	OK	281	0.0	NO LEAKS DETECTED																	
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10	VEC REC 20012 Rev A	<i>(Surrogate data from BL34 9L440 AB)</i> Metalurgical Analysis / Brinell quality	Valeo SLP	The CAC shall meet the minimum requirement requested on VEC REC 0012 specification	PASS 100%	PV	2	D	22 Oct 10	26 Oct 12	2	D	OK	TR 4744	Data surrogate from BL34 9L440 AB OK, samples meet 100% bozza quality evaluation per VEC REC 0012 Rev A																																			
11	CPS 0031 IV / Class A	EXTERNAL CORROSION <i>(Surrogate data from BL34 9L440 AB)</i> Test cond ions ASTM G88 A3 (SWAAT) Use surrogate Data from AL34 6C775 AA (x21 days)	Valeo SLP	The CAC shall meet the acceptance requirement for leak test III A Pressure rate less than 17.2 kPa, after enduring minimum of 21 days	PASS 100%	PV	0	D	N/A	N/A	N/A	OK	TR 3770	<table border="1"> <tr> <th>Sample</th> <th>Hours</th> <th>Leak after Test</th> <th>Testing (psi / sec)</th> <th>Comments</th> </tr> <tr> <td>LB 3150</td> <td>504</td> <td>0.0</td> <td></td> <td>No leaks were detected during or after testing</td> </tr> <tr> <td>LB 3151</td> <td>504</td> <td>0.0</td> <td></td> <td>No leaks were detected during or after testing</td> </tr> </table>	Sample	Hours	Leak after Test	Testing (psi / sec)	Comments	LB 3150	504	0.0		No leaks were detected during or after testing	LB 3151	504	0.0		No leaks were detected during or after testing																					
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12	Valeo PCD 1703, PCD 1714	Vibration test Tri Axial test Road Load data from DPG or MPG testing The test has to be performed with the muffler assembly provided by FORD (O Ring + valve + Muffler)	Valeo AH	Minimum hours Two life cycles (206 hrs.) After completion, the CAC shall have no distortion and no cracks, be fully functional and meet the criteria of the Leak test. This will be applied just to the CAC area Test to prove the performance of tank and header due to the weight added	PASS 100%	PV	2	D	20 Jul 12	30 Jul 12	2	D	OK	TR 50044	REPORT UNDER CREATION <table border="1"> <tr> <th>SAMPLE ID</th> <th>TOTAL OF HOURS</th> <th>LEAK RATE</th> <th>COMMENTS</th> </tr> <tr> <td>03922</td> <td>206</td> <td>0.0</td> <td>TEST PERFORMED WITH FINAL MUFFLER</td> </tr> <tr> <td>03923</td> <td>206</td> <td>0.0</td> <td>TEST PERFORMED WITH FINAL MUFFLER</td> </tr> </table>	SAMPLE ID	TOTAL OF HOURS	LEAK RATE	COMMENTS	03922	206	0.0	TEST PERFORMED WITH FINAL MUFFLER	03923	206	0.0	TEST PERFORMED WITH FINAL MUFFLER																							
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PE13-018 031282



PRODUCT VALIDATION PLAN & REPORT

OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eCBV, 57MA proposal

PLM control:	PVPAR No	PV12 134	REVISION No:	11
EDDM	ORIGIN DATE:	27 May 11	DATE REV:	20 Nov 12
PPCR #:	APPROVAL:			
PPDR #:	N/A	By: Site Manager / R. Ariles		
CUSTOMER APPROVAL:				
NAME		Project Manager or Change Leader		
SIGN				
DATE				
Testing Lab / J.A.R&K or Home U		Other: /		

Change Description:
SREA # 20120817009: Brazing process on alternative oven for CAC P415 and New Crimping press validation due to volume increase (PV12-122)
DL34-9L440-AC & BL34-9L440-AE

NON FUNCTIONAL TESTING

1	CPS 0032 11 A Class A	LEAK TEST Test conditions: Test pressure: 207±14 kPa (g) Test time: 20 sec (for proto type stage) Test medium: ambient compressed air	Valvo SLP	Pressure class size than 17.2 MPa	PASS 100%	PV	ALL	D	27 Sep 12	27 Sep 12	20	D	OK	N/A	Sample matrix test on EDL adjusted to 3.9 Kpa
FUNCTIONAL TEST AND RESTRICTIONS															
2	CPS 0032 11 B Class A	Normal Cleanliness Test description: Measure the internal cleanliness per SAE J1726 air to a CAC Filter size: 1µm	Valvo SLP	CAC must meet to small air size SAE J1726 requirements Max weight: 25 mg Maximum particle size: 3.175mm Maximum particle area: 2.58 mm ² Non ferrous metal particle size <0.05mm and <0.3mm	PASS 100%	PV	2	D	31 Oct 12	31 Oct 12	2	D	OK	TR 1015B	Content (mg): Part size (mm): SAMPLE 1 30.9 0.113 SAMPLE 2 19.2 0.027
3	PDT HVZ 15016	Metallurgic Analysis / Brass quality	Valvo SLP	The CAC shall meet the minimum requirement requested on VEC REC 0012 spot test on	PASS 100%	PV	2	D	31 Oct 12	31 Oct 12	2	D	OK	TR 1016D	THE TWO P415 CAC MET ALL THE DRAWING REQUIREMENTS OF BRAZING ACCORDING TO VALEO STANDARD PDT HVZ 15016
8	CPS 0032 M/E Class B (See receipt on)	HOT PRESSURE CYCLE Cycle pressure: 0 to 150 kPa @ ±21 Kpa (instead of 210 KPa) Charge Inlet Temperature: 185 C±5 C instead of 205 C ±5 0 C Test Medium: Compressed Air Cycle Rate: 50 ops/min (±10 Cycles/min)	Valvo SLP	375 000 MINIMUM CYCLES to pass the tests specification After enduring twice the minimum requirement (750 000) the test can be accelerated by increasing the high pressure to 210 kPa in order to produce a failure	PASS 100%	PV	4	D	13 Oct 12	30 Oct 12	4	D	OK	TR 5455	SAMPLE ID Minimum of Cycles TOTAL CYCLES TESTED OBSERVATIONS LB122632 0.0 375,000 NO LEAKS WERE DETECTED DURING THE TESTING LB122633 0.0 375,000 NO LEAKS WERE DETECTED DURING THE TESTING LB122681 0.0 375,000 NO LEAKS WERE DETECTED DURING THE TESTING LB122682 0.0 375,000 NO LEAKS WERE DETECTED DURING THE TESTING
4	CPS 0032 IV G Class A	PROOF PRESSURE / BURST Pressure: 300 Kpa ± 21 kPa Ramp Time: 10 sec ± 3.0 sec Hold time: Min: 30 sec Test Medium: Water	Valvo SLP	RECORD Sample CAC must meet the acceptance requirement for leak test IIA No in on leakage or tube deform on before 300 Kpa Test acceleration/Burst: Increased pressure at a slow rate until leakage occurs	PASS 100%	PV	5	D	4 Oct 12	5 Oct 12	5	D	OK	TR 5424	Sample Leak @ 300 kPa (3sec) Burst Pressure (kPa / PSI) Observations LB122512 OK 739 / 107 PRESSURE ON OUTLET TANK @ BURST PRESSURE LB122513 OK 793 / 112 PRESSURE ON OUTLET TANK @ BURST PRESSURE LB122514 OK 793 / 112 PRESSURE ON OUTLET TANK @ BURST PRESSURE LB122515 OK 869 / 124 PRESSURE ON OUTLET TANK @ BURST PRESSURE LB122516 OK 717 / 104 PRESSURE ON OUTLET TANK @ BURST PRESSURE

Change Description: Due to Condensation issue in vehicle (PV12-134)
Production change validation for: C.A.C. -> 27mm window Cover Plate added to Inlet and Outlet Header, Non Louverd Turbulators, gasket change (removal two ladder rungs)
WPTS E 12559964 000
DL34-9L440-AC

NON FUNCTIONAL TESTING

1	Drawing	27mm Cover Plate Dimensional	Valvo SLP	Meet the drawing dimensions	PASS 100%	PV	30	D	24 Aug 12	30 Aug 12					SEE DIMENSIONAL REPORT
1	CPS 0032 III A Class A	LEAK TEST Test conditions: Test pressure: 207±14 kPa (g) Test time: 20 sec (for prototype stage) Test medium: ambient compressed air	Valvo SLP	VALIDATION CAC P415 GTDI, 57MA proposal (Plastic tanks)	PASS 100%	PV	ALL CAC	D	15 Aug 12	15 Aug 12			OK	N/A	LEAK CHECKED ON EDL

FUNCTIONAL TEST AND RESTRICTIONS

2	CPS 0032 IV A Class A	HEAT TRANSFER (WITH INTERNAL MASK) Charge side: C/ 0.288 Kg/s (50% On each port) Charge air inlet temp: 125±1.1°C Charge air inlet pressure: 200 Kpa A Ambient temp: 25°C Air Speed (5.7 m/s): 1.06 Kg/s RESULTS WILL BE USED TO DEFINE NEW COOLING AND EFFECTIVENESS SPECIFICATION	Valvo SLP	Performance operation point 0.288 Kg/s/1.07 Kg/s CAC Effectiveness TBD % ± 5% Maximum Internal Pressure Drop TBD kPa ± 10% 9 point matrix to be printed on the drawing, CAC Effectiveness and pressure drop Cooling air flow: 0.154, 0.62, 1.08 kg/s Charge Air Flow: 0.12, 0.19 & 0.288 kg/s	PASS 100%	PV	5 CAC	D	20 Aug 12	24 Aug 12	5	D	OK	TR 5363	AVERAGE RESULTS FROM 5 SAMPLES TESTED HEAT REACTION (EFFICIENCY %) AIR VELOCITY (m/s) CAMP RE AIR FLOW (kg/s) JP Internal Air (kg/s) AIR VELOCITY (m/s) JP FLOW (kg/s) CAMP RE AIR FLOW (kg/s) AIR VELOCITY (m/s) JP FLOW (kg/s)
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PE13-018 031283

PRODUCT VALIDATION PLAN & REPORT

****CONFIDENTIAL****
OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eCBV, 57MA proposal

PLM control:	PVPAR No	PV12 134	REVISION No:	11
EDM:	ORIGIN DATE:	27 May 11	DATE REV:	20 Nov 12
PPCR #:	APPROVAL:			
PPDR #:	RD Manager / J. Barthe	Qual. by Site Manager / K. Kollis		

MODEL YEARS:	COMPONENT / ASSY:	VALEO P.N.	DRAWING & REV	SUPPLIER NAME:
2013	Charger Cooler (CAC)	M 165170	100046940 REV A	Valeo Termico
PROJECT APPLICATION (S)	CUSTOMER:	CUSTOMER P.N.	ASSEMBLY PLANT:	ORIGINATOR:
FORD F Series GTDI	FORD		VEC SLP	GUILERMO GUADARRAMA

CUSTOMER APPROVAL:	
NAME	SDN DATE
PVP's Coordinator/ E. Barthe Project Manager or Charge Leader Testing Lab/ J.A.R& or Home U Other: /	

3	CPS 0032, IV A Class A	HEAT TRANSFER (WITH INTERNAL MASK AND S TUBE BLOCKER) Charge side Q' 0.288 Kg/s (50% On each port) Charge air inlet temp 125±1 °C Charge air inlet pressure 200 Kpa A Ambient temp 20°C Air Speed (5.7 m/s) 1.06 Kg/s RESULTS WILL BE USED TO DEFINE NEW COOLING AND EFFECTIVENESS SPECIFICATION	Valvo SLP Performance operation point 0.288 Kg/s/ 1.87 Kg/s CAC Effectiveness TBD % ± 5% Maximum Internal Pressure Drop TBD kPa ± 10% If point matrix to be printed on the drawing, CAC Effectiveness and pressure drop Coding air flow 0.154, 0.62, 1.06 kg/s Charge Air Flow 0.12, 0.19 & 0.288 kg/s	PASS 100%	PV	1 CAC	D	23 Aug 12	23 Aug 12	1	D	OK	TR 5363	*1 SAMPLE TESTED <table border="1"> <tr> <th colspan="2">HEAT REACTION (EFFICIENCY %)</th> <th colspan="2">AIR VELOCITY (m/s)</th> </tr> <tr> <td></td> <td></td> <td>6.81</td> <td>5.27</td> </tr> <tr> <td>CAMP</td> <td>ARI FLOW (kg/h)</td> <td>432</td> <td>653</td> </tr> <tr> <td></td> <td></td> <td>694</td> <td>537</td> </tr> <tr> <td></td> <td></td> <td>1937</td> <td>671</td> </tr> </table> <table border="1"> <tr> <th colspan="2">OF External ARI (Pa)</th> <th colspan="2">AIR VELOCITY (m/s)</th> </tr> <tr> <td></td> <td></td> <td>6.81</td> <td>5.27</td> </tr> <tr> <td>INT FLOW (kg/h)</td> <td></td> <td>704</td> <td>582</td> </tr> </table> <table border="1"> <tr> <th colspan="2">CAMP AIR FLOW (kg/h)</th> </tr> <tr> <td>532</td> <td>694</td> </tr> <tr> <td>1937</td> <td>1937</td> </tr> </table>	HEAT REACTION (EFFICIENCY %)		AIR VELOCITY (m/s)				6.81	5.27	CAMP	ARI FLOW (kg/h)	432	653			694	537			1937	671	OF External ARI (Pa)		AIR VELOCITY (m/s)				6.81	5.27	INT FLOW (kg/h)		704	582	CAMP AIR FLOW (kg/h)		532	694	1937	1937
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4	CPS 0032, IV G Class B (See exception)	HOT AGE TEST Chamber Temperature 185°C ± 5.0°C, instead of 205 °C All Parts will be used for Flow to Blow off Outlet Rate	Valvo SLP The CAC shall not develop a crimp or tank leakage that exceed a leak rate of 5.00 ccm/min at 207 kPa after enduring min. time requirement Minimum life Inlet side 200 hrs Minimum life Outlet side 75 hrs	PASS 100%	PV	2 CAC	D	17 Aug 12	28 Aug 12	2	D	OK	TR 5373	<table border="1"> <tr> <th>SAMPLE ID</th> <th>30 HOURS (INLET SIDE)</th> <th>75 HOURS (OUTLET SIDE)</th> <th>TOTAL OF HOURS TESTED</th> <th>LEAK RATE AFTER TEST</th> <th>COMMENTS</th> </tr> <tr> <td>LB122152</td> <td>OK</td> <td>OK</td> <td>201</td> <td>0.0</td> <td>NO LEAKS DETECTED</td> </tr> <tr> <td>LB122153</td> <td>OK</td> <td>OK</td> <td>201</td> <td>0.0</td> <td>NO LEAKS DETECTED</td> </tr> </table>	SAMPLE ID	30 HOURS (INLET SIDE)	75 HOURS (OUTLET SIDE)	TOTAL OF HOURS TESTED	LEAK RATE AFTER TEST	COMMENTS	LB122152	OK	OK	201	0.0	NO LEAKS DETECTED	LB122153	OK	OK	201	0.0	NO LEAKS DETECTED																				
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6	No Spec associated	Pull Off Force (Cover will be pulled from header after crimping) Recorded as: Newton force required to pull cover from the crimp (rise from tube) Rate 5 ± 1 mm/min Test part as crimped (6) Test after Pre heat (6) Pre heating Chamber Temperature 185°C ± 5.0 °C Will be performed just on cores	Valvo SLP Pre Heating NO LEAK TEST REQUIRED The core must meet the requirement of minimum of 200 hrs New test so no criteria published at this time RECORD	PASS 100%	PV	12 CORE	D	17 Aug 12	29 Aug 12	12	D	OK	TR 9624	<p>CRIMPED IN 8 LOCATIONS SEE PICTURE FOR MORE DETAIL</p> <p>BEFORE HOT AGE TEST:</p> <table border="1"> <tr> <th>SAMPLE ID</th> <th>MAXIMUM FORCE (N)</th> </tr> <tr> <td>SAM 1</td> <td>1980</td> </tr> <tr> <td>SAM 2</td> <td>725</td> </tr> <tr> <td>SAM 3</td> <td>1805</td> </tr> <tr> <td>SAM 4</td> <td>995</td> </tr> <tr> <td>SAM 5</td> <td>734</td> </tr> <tr> <td>SAM 6</td> <td>1382</td> </tr> </table> <p>AFTER HOT AGE TEST:</p> <table border="1"> <tr> <th>SAMPLE ID</th> <th>MAXIMUM FORCE (N)</th> </tr> <tr> <td>LB122154</td> <td>1991</td> </tr> <tr> <td>LB122155</td> <td>2011</td> </tr> <tr> <td>LB122156</td> <td>1830</td> </tr> <tr> <td>LB122157</td> <td>2253</td> </tr> <tr> <td>LB122158</td> <td>1333</td> </tr> <tr> <td>LB122159</td> <td>2041</td> </tr> </table>	SAMPLE ID	MAXIMUM FORCE (N)	SAM 1	1980	SAM 2	725	SAM 3	1805	SAM 4	995	SAM 5	734	SAM 6	1382	SAMPLE ID	MAXIMUM FORCE (N)	LB122154	1991	LB122155	2011	LB122156	1830	LB122157	2253	LB122158	1333	LB122159	2041										
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7	No Spec associated	Flow to Blow off Outlet Rate After hot age test completion With no inlet cover and only outlet cover (fully assembled CAC) apply during 10 min The max flow the CAC could ever see in the vehicle (1560 kg/hr) Test will be made on Heat Transfer bench at the same conditions as Heat Transfer test except for the flow.	Valvo SLP Cover must still be attached to the tube	PASS 100%	PV	2 CAC	D	28 Aug 12	28 Aug 12	2	D	OK	TR 5370	<p>AFTER HOT AGE TEST:</p> <table border="1"> <tr> <th>SAMPLE ID</th> <th>FLOW = 1560 kg/hr @ 17%</th> </tr> <tr> <td>LB122152</td> <td>PASS</td> </tr> <tr> <td>LB122153</td> <td>PASS</td> </tr> </table> <p>IN SIDE:</p> <p>OUT SIDE:</p> <p>COMMENTS AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT</p>	SAMPLE ID	FLOW = 1560 kg/hr @ 17%	LB122152	PASS	LB122153	PASS																																
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PE13-018 031284



PRODUCT VALIDATION PLAN & REPORT

OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eCBV, 57MA proposal

PLM control:	PVPAR No	PV12 134	REVISION No:	11
EDM:	ORIGIN DATE:	27 May 11	DATE REV:	20 Nov 12
PPCR #:	APPROVAL:			
PPDR #:	RD Manager / R. Sanchez	Qual by Site Manager / R. Anolis		
CUSTOMER APPROVAL:				
NAME		PTP's Coordinator / E. Berlio		
SIGN		Project Manager or Change Leader		
DATE		Testing Lab / J.A.R& or Home U		
		Other: /		

Change Description: Second validation due to Condensation issue in vehicle (PV12-161)

Production change validation for: C.A.C. -> Final production tube cover process validation, 27mm window Cover Plate added to Inlet and Outlet Header, Non Louverd Turbulators, gasket change (removal two ladder rungs)

WPTS E 12559864 000

DL34-9L440-AC & BL34-9L440-AE

NON FUNCTIONAL TESTING

1	CPS 0032 III A Class A	Valco SLP	LEAK TEST Test cond issue Test pressure: 207±14 kPa (g) Test time: 20 sec (for prototype stage) Test medium: ambient compressed air	VALIDATION CAC P415 GTDI, 57MA proposal (Plastic tanks)	PASS 100%	PV	ALL CAC	D	27 Sep 12	27 Sep 12	ALL CAC	D	OK	NA	LEAK CHECKED ON EOL
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FUNCTIONAL TEST AND RESTRICTIONS

2	CPS 0032, IV A Class A	Valco SLP	HEAT TRANSFER (WITH INTERNAL MASK) Charge side Q' 0.288 Kg/s (50% On each port) Charge air inlet temp: 125±1 °C Charge air inlet pressure: 200 Kpa A Ambient temp: 25°C Air Speed (5.7 m/s): 1.08 Kg/s RESULTS WILL BE USED TO DEFINE NEW COOLING AND EFFECTIVENESS SPECIFICATION	Performance operation point 0.288 Kg/s/1.07 Kg/s CAC Effectiveness TBO % ± 5% Minimum Inlet Pressure Drop TBO kPa ± 10% 9 point matrix to be printed on the drawing, CAC Effectiveness and pressure drop Cooling air flow: 0.154, 0.62, 1.08 kg/s Charge Air Flow: 0.12, 0.19 & 0.288 kg/s	PASS 100%	PV	5 CAC	D	20 Aug 12	24 Aug 12	5	D	OK	TR	<p>AVERAGE RESULTS FROM 5 SAMPLES TESTED</p> <table border="1"> <thead> <tr> <th rowspan="2">HEAT REJECTION EFFICIENCY %</th> <th colspan="3">AIR VELOCITY (m/s)</th> </tr> <tr> <th>6.01</th> <th>3.27</th> <th>9.7</th> </tr> </thead> <tbody> <tr> <td>432</td> <td>15.2</td> <td>17.5</td> <td>10.5</td> </tr> <tr> <td>604</td> <td>14.1</td> <td>6.0</td> <td>7.5</td> </tr> <tr> <td>1637</td> <td>11.1</td> <td>11.9</td> <td>17.0</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Q' Charge Air (kg/s)</th> <th colspan="3">AIR VELOCITY (m/s)</th> </tr> </thead> <tbody> <tr> <td>0.288</td> <td>9.0</td> <td>24.1</td> <td>90.1</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Q' Inlet Air (kg/s)</th> <th colspan="3">CAMPRE AIR FLOW (kg/s)</th> </tr> </thead> <tbody> <tr> <td>432</td> <td>1.64</td> <td>1.84</td> <td>1037</td> </tr> <tr> <td>604</td> <td>1.34</td> <td>1.03</td> <td>713</td> </tr> </tbody> </table>	HEAT REJECTION EFFICIENCY %	AIR VELOCITY (m/s)			6.01	3.27	9.7	432	15.2	17.5	10.5	604	14.1	6.0	7.5	1637	11.1	11.9	17.0	Q' Charge Air (kg/s)	AIR VELOCITY (m/s)			0.288	9.0	24.1	90.1	Q' Inlet Air (kg/s)	CAMPRE AIR FLOW (kg/s)			432	1.64	1.84	1037	604	1.34	1.03	713
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6	CPS 0032, IV E Class B (See exception)	Valco GREEN	HOT PRESSURE CYCLE Cycle pressure: 0 to 150 kPa g ± 21 Kpa, instead of 210 KPa Charge Inlet Temperature: 205 Ca5 0°C Test Medium: Compressed Air Cycle Rate: 50 cycles/min (± 10 Cycles/min) The test has to be performed with the muffler assembly provided by FORD	375,000 MINIMUM CYCLES to pass the test specification	PASS 100%	PV	4 CAC	D	13 Oct 12	30 Oct 12	4	D	OK	TR 5465	<table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>Minimum of Cycles</th> <th>TOTAL CYCLES TESTED</th> <th>OBSERVATIONS</th> </tr> </thead> <tbody> <tr> <td>LB122632</td> <td>375,000</td> <td>375,000</td> <td>NO LEAKS WERE DETECTED DURING THE TESTING</td> </tr> <tr> <td>LB122633</td> <td>375,000</td> <td>375,000</td> <td>NO LEAKS WERE DETECTED DURING THE TESTING</td> </tr> <tr> <td>LB122681</td> <td>375,000</td> <td>375,000</td> <td>NO LEAKS WERE DETECTED DURING THE TESTING</td> </tr> <tr> <td>LB122682</td> <td>375,000</td> <td>375,000</td> <td>NO LEAKS WERE DETECTED DURING THE TESTING</td> </tr> </tbody> </table>	SAMPLE ID	Minimum of Cycles	TOTAL CYCLES TESTED	OBSERVATIONS	LB122632	375,000	375,000	NO LEAKS WERE DETECTED DURING THE TESTING	LB122633	375,000	375,000	NO LEAKS WERE DETECTED DURING THE TESTING	LB122681	375,000	375,000	NO LEAKS WERE DETECTED DURING THE TESTING	LB122682	375,000	375,000	NO LEAKS WERE DETECTED DURING THE TESTING																			
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PE13-018 031285






PRODUCT VALIDATION PLAN & REPORT

OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eCBV, 57MA proposal

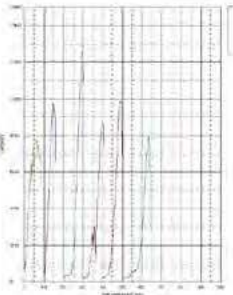
PLM control:	PVPAR No	PV12 134	REVISION No:	11
EDOE	ORIGIN DATE:	27 May 11	DATE REV:	20 Nov 12
PPCR #:	APPROVAL:			
PPDR #:	NA	Lead Site Manager / R. Bello		

MODEL YEARS:	COMPONENT / ASSY:	VALEO P/N	DRAWING & REV	SUPPLIER NAME:	CUSTOMER APPROVAL:				
2013	Charger Cooler (CAC)	M 165170	100046940 REV A	Valeo Termico	NAME	SGN	DATE		
PROJECT APPLICATION (S)	CUSTOMER:	CUSTOMER P/N	ASSEMBLY PLANT:	ORIGINATOR:	PPDR's Coordinator / E. Bello				
FORD F Series GTDI	FORD	[REDACTED]	VEC SLP	GUILLEMO GUADARRAMA	Testing Lab / J.A.R. & Honor U				

7	No Spec associated	Pull Off Force (Cover will be pulled from header after crimping) Recorded as: Newton force required to pull cover from the crimp (free from tube) Rate 5 +/- 1 mm/min Test part as crimped (6)	Valeo SLP New test so no criteria published at this time RECORD	PASS 100%	PV	6	D	26 Oct 12	26 Oct 12	6	D	OK	TR 9979	<p>IF PARTS WILL BE TESTED WITHOUT HOT EDGE TEST</p> <p>CRIMPED N 8 LOCATIONS SEE PICTURE FOR MORE DETAIL</p> <p>BEFORE HOT AGE TEST:</p> <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>MAXIMUM FORCE (N)</th> </tr> </thead> <tbody> <tr> <td>SAM 1</td> <td>341</td> </tr> <tr> <td>SAM 2</td> <td>679</td> </tr> <tr> <td>SAM 3</td> <td>1023</td> </tr> <tr> <td>SAM 4</td> <td>1041</td> </tr> <tr> <td>SAM 5</td> <td>1226</td> </tr> <tr> <td>SAM 6</td> <td>1363</td> </tr> </tbody> </table> 	SAMPLE ID	MAXIMUM FORCE (N)	SAM 1	341	SAM 2	679	SAM 3	1023	SAM 4	1041	SAM 5	1226	SAM 6	1363
SAMPLE ID	MAXIMUM FORCE (N)																											
SAM 1	341																											
SAM 2	679																											
SAM 3	1023																											
SAM 4	1041																											
SAM 5	1226																											
SAM 6	1363																											

8	No Spec associated	Flow to Blow off Outlet Rate With no inlet cover and only outlet cover (fully assembled CAC) apply during 10 min The max flow the CAC could oversee in the vehicle (1560 lph) Test will be made on Heat Transfer bench at the same conditions as Heat Transfer test except for the flow.	Valeo SLP Cover must still be attached to the tubes	PASS 100%	PV	2	CAC	D	1 Nov 12	1 Nov 12	2	D	OK	TR 5463	<p>THE PARTS WILL BE TESTED WITHOUT HOT EDGE</p> <p>AFTER HOT AGE TEST:</p> <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>FLOW = 1560 lph/min @170c</th> <th>COMMENTS</th> </tr> </thead> <tbody> <tr> <td>SAMPLE 1</td> <td>PASS</td> <td>AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT</td> </tr> <tr> <td>SAMPLE 2</td> <td>PASS</td> <td>AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT</td> </tr> </tbody> </table> <p>RH SIDE:</p>  <p>LH SIDE:</p> 	SAMPLE ID	FLOW = 1560 lph/min @170c	COMMENTS	SAMPLE 1	PASS	AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT	SAMPLE 2	PASS	AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT
SAMPLE ID	FLOW = 1560 lph/min @170c	COMMENTS																						
SAMPLE 1	PASS	AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT																						
SAMPLE 2	PASS	AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT																						

Production change validation for: C.A.C. --> Pre-PV for validation of 2nd flaring machine to support Alert A12633189 (PV12-197)
DL34-9L440-AC

1	No Spec associated	Pull Off Force (Cover will be pulled from header after crimping) Recorded as: Newton force required to pull cover from the crimp (free from tube) Rate 5 +/- 1 mm/min Test part as crimped (6)	Valeo SLP Pre Heating NO LEAK TEST REQUIRED The core must meet the requirement of minimum of 200 hrs New test so no criteria published at this time RECORD	PASS 100%	PV	6	D	22 Nov 12	22 Nov 12	6	D	OK	TR 10332	<p>IF PARTS WILL BE TESTED WITHOUT HOT EDGE TEST</p> <p>CRIMPED N 8 LOCATIONS</p> <table border="1"> <thead> <tr> <th>SAMPLE ID</th> <th>MAXIMUM FORCE (N)</th> </tr> </thead> <tbody> <tr> <td>SAM 1</td> <td>782</td> </tr> <tr> <td>SAM 2</td> <td>364</td> </tr> <tr> <td>SAM 3</td> <td>366</td> </tr> <tr> <td>SAM 4</td> <td>1232</td> </tr> <tr> <td>SAM 5</td> <td>971</td> </tr> <tr> <td>SAM 6</td> <td>799</td> </tr> </tbody> </table>  <p>Picture 1 - Crimp of the P415 CAC's</p>	SAMPLE ID	MAXIMUM FORCE (N)	SAM 1	782	SAM 2	364	SAM 3	366	SAM 4	1232	SAM 5	971	SAM 6	799
SAMPLE ID	MAXIMUM FORCE (N)																											
SAM 1	782																											
SAM 2	364																											
SAM 3	366																											
SAM 4	1232																											
SAM 5	971																											
SAM 6	799																											

PE13-018 031286







PRODUCT VALIDATION PLAN & REPORT

CONFIDENTIAL
OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eCBV, 57MA proposal

PLM control:	PVPAR No	PV12 134	REVISION No:	11
ECOE	ORIGIN DATE:	27 May 11	DATE REV:	20 Nov 12
PPCR #:	APPROVAL:			
PPDR #:	R&D Manager / R. Sanchez	Quality Site Manager / K. Koller		
	PTP's Coordinator / E. Barba	Project Manager or Change Leader		
	Testing Lab / J. A. R. & or Homer U	Other: /		

MODEL YEARS:	COMPONENT / ASSY:	VALEO P.N.	DRAWING & REV	SUPPLIER NAME:	CUSTOMER APPROVAL:				
20 13	Charger Cooler (CAC)	M 165170	100046940 REV A	Valeo Termico	NAME	SGN	DATE		
PROJECT APPLICATION (S)	CUSTOMER:	CUSTOMER P.N.	ASSEMBLY PLANT:	ORIGINATOR:					
FORD F Series GTDI	FORD		VEC SLP	GUILLERMO GUADARRAMA					

2	No Spec associated	Flow to Blow off Outlet Plate After hot age test completion With no inlet cover and only outlet cover (fully assembled CAC) apply during 10 min. The max flow the CAC could ever see in the vehicle (1560 kg/h) Test will be made on Heat Transfer bench at the same conditions as Heat Transfer test except for the flow.	Valeo SLP	Cover must stl (be attached to the tube	PASS 100%	PV	2	D	22 Nov 12	22 Nov 12	2	D	OK	TR 5407	<p>THE PARTS WILL BE TESTED WITHOUT HOT EDGE:</p> <p>AFTER HOT AGE TEST:</p> <p>SAMPLE ID FLOW = 1560 kg/h @110: LB122096 PASS LB122097 PASS</p> <p>COMMENTS AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT</p> <p>GRILLE SIDE:</p>   <p>ENGINE SIDE:</p>  
---	--------------------	--	-----------	---	-----------	----	---	---	-----------	-----------	---	---	----	---------	---

PROCEDURE:	TEST DESCRIPTION:	ACCEPTANCE CRITERIA:	TARGET REQ'D:	TEST STAGE:	SAMPLES TESTED:	COMPLETIVE:	ACTUAL RESULTS:
SPECIFY THE GOVERNING TEST PROCEDURE OR STANDARD	PROVIDE A BRIEF DESCRIPTION OF EACH TEST	SPECIFY CYCLES MILES VOLTS MINIMUM VALUES NO FAILURES ETC	STAGE REQ'D RELIABILITY OR NO FAILURE	ED-ENGINEERING DESIGN DV-DESIGN VALIDATION PV- PRODUCTION VALIDATION OC- CONTINUOUS CONFORMANCE	LIST QUANTITY TESTED SAMPLES TYPE, ETC	A- PROTOTYPE (HAND MADE) B- PROTOTYPE (TOOL D) C- PROGRAM LEVEL D- INITIAL PRODUCTION	LIST RESULT IN TERMS OF EG: R40 OK; PASS OR NO FAILURE; NO# OF CYCLES WITH OR WITHOUT FAILURE

PV CHANGES CONTROL:

Rev	Date	Change description / NOTES
1	27 May 11	PVPAR released. In customer approval
2	04 Oct 11	1) Hot Age added per customer request 2) Comments added
3	04 May 12	1) Inherent IV added 2) Comments added
4	12 Jun 12	1) Complete PV12 059 with data
5	30 Jul 12	1) Complete PV11 081 with data 2) WPTS add km
6	15 Ago 12	1) Addition of PV12 022 Blasting process on alternative cover for CAC P415 and New Coating process validation due to volume increase 2) Addition of PV12 034 27mm window Cover Plate added to Inlet and Outlet Header. Non Laminar Turbulence on gasket change
7	15 Ago 12	1) Addition of Flow to Blow off Out of plate
8	20 Ago 12	1) Defrue test ng
9	27 Ago 12	1) Complete with data
10	13 Sep 12	1) Final production tube cover process validated on (PV12 161)
11	20 Nov 12	1) Add Pre PV Validation of 2nd Safety station to support Rev A 0203160 (PV12 081)

PE13-018 031287

Alert: A12633189 Type: U USE PPM Status: W ECC:
Orig Acty: NB00 BODY COMMODITY FAO Date: 12/11/20 Rte: N
Name: GUADARRAMA, GUILLERM Loc: VALEO,SLP, MEXICO Phone: 444-826-6600
E-Mail: guillermo.guadarrama@valeo.com Multimedia: N
Desc: SHIP PARTS WITH A PRE-PV FINISHED AND WITHOUT PPAP.
Lang: E PARTS SHIPMENT ONLY AFTER PRE-PV COMPLETED AND OK.
* (MORE)

Model>> Yr: 13 Lead: TVF6 Other:
Plants Aff: NA06 NA23
Prod Aff: 2013 P415 3.5L GTDI

Supp Docs: Qty:
Emission: 000
Alert Start Date: 12/11/26 S Appearance: N
Duration: 059 Build Event: CB
Calc Expiration: 13/01/24 Homologation: N (Y/N)
Authorized: (Y/N) (User ID) Vehicle Saleable: Y (Y/N)

Closure Statement:

Select: A=Approval B=Parts C=Concern D=Description S=Summary
0=Web Print P=Print R=Raise Alert W=WACTS X=Xrf Menu

Press <ENTER> for Alert Base Information Continuation screen (LAST)

31288

WWRSC16A CONFIDENTIAL Alert Base Information (Continued) 12/11/20 18:22:31

Alert: A12633189 Type: U USE PPM Status: W ECC:

Orig Acty: NB00 BODY COMMODITY FAO Date: 12/11/20

Name: GUADARRAMA, GUILLERM Loc: VALE0,SLP, MEXICO Phone: 444-826-6600

Lang: E

Desc: SHIP PARTS WITH A PRE-PV FINISHED AND WITHOUT PPAP.
PARTS SHIPMENT ONLY AFTER PRE-PV COMPLETED AND OK.

*

(MORE)

Model Codes =====

Lead: TVF6

Other:

Plants Affected =====

NA06 NA23

Costs/Weights =====

Piece Cost (I): _____
Tool Cost (I): _____
Weight Effect (I): _____

Select: _ A=Approval B=Parts C=Concern D=Description S=Summary
0=Web Print P=Print R=Raise Alert W=WACTS X=Xrf Menu

Press <ENTER> for Alert Base Information screen

Alert: A12633189

Status: W

List=>> Name: [redacted] User: C 7081 GCG1166

C	A	C	Reg	Dept	Userid	Activity	Name	Rtg Ind	Date Sent	Date Approved	A P	S T	R M
-			C	7081	GCG1166	NB00	GUADARRAMA, GUILLERM			12/11/20		W	*N
-			N	LTPTSE	JST8844		TYLER, JIM S.	P					N
-			N	LTPTSE	MKRAMER1		KRAMER, MICHAEL T.	P					N
-			N	PWRTRAIN	CKG0234		GALAS, C. K.	P					N
-			-	-	-	-	-	-					-
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Select: A=Approval B=Parts C=Concern D=Description S=Summary
 0=Web Print P=Print R=Raise Alert W=Wacts X=Xrf Menu
 F2=Build List F3=Mail All F5=Acty List F6=Directory F9=Page Back

WWRSC13A CONFIDENTIAL Alert Parts 12/11/20 18:23:15

Alert: A12633189 Type: U Acty: NB00 (LAST) Status: W

Name: GUADARRAMA, GUILLERMO Phone: 444-826-6600 UserID: C 7081 GCG1166

E-Mail: guillermo.guadarrama@valeo.com

Alert Part: DL34 6K775 B Desc: COOL ASY ENG CHG AIR

Replaced Part: Desc:

Supplier Name: VALEO SISTEMAS ELECTRICOS, SLP, MEXICO Supplier#: FZWEA

Interim PRE-PV WILL BE RUN WITH PARTS COMMING FROM FLARING STATION NO.2

Action:

Build Event: CB Beginning Rotation: Start Date: 12/11/26

Ending Rotation: Ending Date: 13/01/24

Safety: N Flammability: N Emission: N

Assembly Cntl: - Vehicle Saleable: Y Homol: N MPNR:

StockDisp: - Component/Final Assy: F Acty-CPSC-Seq: NB00 030305 000

Interchng: - Quantity: Total Qty Trialed:

Piece Cst(I): - Tool Cst(I): Weight(I): UM:

Select: A=Approval B=Parts C=Concern D=Description S=Summary

O=Web Print P=Print R=Raise Alert W=WACTS X=Part Cpy

F2=Create From F3=Create New

(MORE)

TN3641

05/019

031291

WWRSC13A CONFIDENTIAL Alert Parts 12/11/20 18:25:09

Alert: A12633189 Type: U Acty: NB00 (LAST) Status: W
Name: GUADARRAMA, GUILLERMO Phone: 444-826-6600 UserID: C 7081 GCG1166
E-Mail: guillermo.guadarrama@valeo.com

Alert Part: DL34 9L440 AC Desc: INTR/CLR INTK MANF
Replaced Part: Desc:
Supplier Name: VALEO SISTEMAS ELECTRICOS, SLP, MEXICO Supplier#: FZWEA

Interim PRE-PV WILL BE RUN WITH PARTS COMMING FROM FLARING STATION NO.2
Action:

Build Event: CB Beginning Rotation: Start Date: 12/11/26
Ending Rotation: Ending Date: 13/01/24
Safety: N Flammability: N Emission: N
Assembly Cntl: Vehicle Saleable: Y Homol: N MPNR:
StockDisp: Component/Final Assy: F Acty-CPSC-Seq: NB00 030305 000
Interchnq: Quantity: Total Qty Trialed:
Piece Cst(I): Tool Cst(I): Weight(I): UM:

Select: A=Approval B=Parts C=Concern D=Description S=Summary
0=Web Print P=Print R=Raise Alert W=WACTS X=Part Cpy
F2=Create From F3=Create New

(MORE)

TN3641

05/019

WWRSC14A CONFIDENTIAL

Alert Description and Response

12/11/20 18:25:45

Alert : A12633189

Mailbox Desc Chg: --

Activity: NB00

Language: E

Rgn/Acty	Entry
Dept	User

SHIP PARTS WITH A PRE-PV FINISHED AND WITHOUT PPAP.
PARTS SHIPMENT ONLY AFTER PRE-PV COMPLETED AND OK.

C NB00	12/11/20
7081	GCG1166

*

1. WHAT IS THE PURPOSE OF THIS PRODUCTION ALERT ?

SHIP PARTS WITHOUT PPAP APPROVED

C NB00	12/11/20
7081	GCG1166

2. WHAT IS CHANGED FROM THE ALERTED PART ?

THE PART WAS NOT CHANGED, JUST A PLASTIC COVER FLAIRING
MACHINE ADDED DUE TO VOLUME INCREASE

3. ARE THE COSTS THAT NEED TO BE AUTORIZED ?

COSTS ALREADY AUTORIZED

4. HOW ARE THE ALERTED PARTS GOING TO BE IDENTIFIED ?

ALERT SIGN ON CONTAINERS

5. ANY IMPACT TO REALEASE QUATITY OF ANY PART ?

NO

6. ARE THE TRIAL PARTS/VEHICLES SEALABLE ?

YES

7. IS FUNCTION AFFECTED ?

NO

Select: _ A=Approval B=Parts C=Concern D=Description S=Summary
 O=Web Print P=Print R=Raise Alert W=WACTS X=Xrf Menu

PF3=Mailbox User PF6=User Directory PF9=Text Edit

(MORE)

TI3641

03/036

031293

WWRSC14A CONFIDENTIAL

Alert Description and Response

12/11/20 18:35:23

Alert : A12633189

Mailbox Desc Chg:

Activity: NB00

Language: E

Rgn/Acty	Entry
Dept	User

- | | | | | |
|---|--------------------------|------|------|----------|
| 8. IS APPEARANCE AFFECTED ? | NO | C | NB00 | 12/11/20 |
| 9. IS THE ASSEMBLY PROCESS AFFECTED ? | NO | 7081 | | GCG1166 |
| 10. HOW LONG WITH THE ALERT BEEN AFFECT ? | 59DAYS | | | |
| 11. WHAT IS THE RISK ASSOCIATED WITH THIS CHANGE ? | | | | |
| THE RISK WILL BE MITIGATED WITH THE PRE-PV COMPLETION | | | | |
| 12. WHAT IS THE BACK UP PLAN ? | | | | |
| USING FLARING MACHINE NO.1 | | | | |
| 13. WHAT EVALUATION IS REQUIRED AT VEHICLE LEVEL ? | NONE | | | |
| 14. WHO WILL CONDUCT SING-OFF AND QLS REALASE ? | TBD BY FORD | | | |
| 15. ARE THE PARTS SALEBLE ? | YES | | | |
| 16. IS THE PV COMPLETED ? | PRE-PV WILL BE PERFORMED | | | |
| 17. ARE THE PARTS OFF THE PRODUCTION TOOLING ? | YES | | | |
| 18. ARE THE PARTS OFF HOME LINE ? | YES | | | |
| 19. ENGINEERING RISK: | NO RISK | | | |
| 20. AFFECTED VEHICLES: | 2013 P415 3.5L | C | NB00 | 12/11/20 |

Select: _ A=Approval B=Parts C=Concern D=Description S=Summary
 0=Web Print P=Print R=Raise Alert W=WACTS X=Xrf Menu
 PF3=Mailbox User PF6=User Directory PF9=Text Edit

(MORE)

WWRSC14A CONFIDENTIAL

Alert Description and Response

12/11/20 18:35:45

Alert : A12633189

Mailbox Desc Chg: -

Activity: NB00

Language: [icon]

Rgn/Acty	Entry
Dept	User

20. AFFECTED VEHICLES: 2013 P415 3.5L

C NB00 12/11/20

21. SUPPLIER CONTACT INFORMATION:

7081 GCG1166

VALEO SISTEMAS ELECTRICOS

BLAS FERNANDO GUTIERREZ

+52 444 826 6612

BLAS-FERNANDO.GUTIERREZ@VALEO.COM

Select: - A=Approval B=Parts C=Concern D=Description S=Summary
 O=Web Print P=Print R=Raise Alert W=WACTS X=Xrf Menu
 PF3=Mailbox User PF6=User Directory PF9=Text Edit

(LAST)

TN3641

03/036

WWRSC17A TN171976 Alert Parts Summary 2012/11/20 18:36:09
 Alert: A12633189 Type: U Acty: NB00 (last) Status: W
 Name: GUADARRAMA, GUILLERM Phone: 444-826-6600 UserID: C 7081 GCG1166
 E-Mail: guillermo.guadarrama@valeo.com

Sel	Alert Part	Part Desc	Acty-CPSC-Seq
█	DL34 6K775 B	COOL ASY ENG CHG AIR	NB00 030305 000
-	DL34 9L440 AC	INTR/CLR INTK MANF	NB00 030305 000

Select - A=Approval B=Parts C=Concern D=Description S=Summary
 O=Web Print P=Print R=Raise Alert W=WACTS X=Xrf Menu
 (LAST)
 TN3641 06/003

From: Guillermo GUADARRAMA [guillermo.guadarrama@valeo.com]
Sent: Tuesday, August 28, 2012 2:53 PM
To: Tyler, Jim (J.S.); Kramer, Michael (M.T.)
Cc: David CASTILLO
Subject: Re: PVP&R for CAC P415 with Plastic Internal Cover.
Attachments: PVP&R CAC P415 NEW CAC eCBV Ford Hystorical changes - Advance.pdf

Jim/Mike,

Attached you will find the PVP&R with you requests and with the final test comeleted (Flow Blow Test)

We are preparing the reports.

Thanks.

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
mail: guillermo.guadarrama@valeo.com

On Mon, Aug 27, 2012 at 5:41 PM, Guillermo GUADARRAMA <guillermo.guadarrama@valeo.com> wrote:
Jim/Mike,

After our meeting I already fix some points that you requested.

I am still missing the 6 tube blocker report and the pictures from the vibration test after un-crimp the tanks.

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
mail: guillermo.guadarrama@valeo.com

On Mon, Aug 27, 2012 at 3:00 PM, Guillermo GUADARRAMA <guillermo.guadarrama@valeo.com> wrote:
Jim/Mike,

I am sending you the preliminary PVP&R cover sheet.

This include all results except the Flow blow test that is going to be performed tonight.

Please review it and send me your comments.

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
mail: guillermo.guadarrama@valeo.com

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at the above address and destroy it.



PRODUCT VALIDATION PLAN & REPORT

OBJECTIVE: PRODUCT VALIDATION NEW CAC P415+GRV_57MA proposal (Plastic) (en)

PLM code:	PROJ No:	PV12 134	REVISION:	9
ECR:	ORIG DATE:	27 May 11	DATE REV:	27 Aug 12
PPDR E: N/A	APPROVAL:			
PPDR E: N/A				

MODEL YEAR	COMPONENT / ASBY	VALID FN	DRAWING & REV	SUPPLIER NAME	CUSTOMER APPROVAL
2013	Charge Cooler (CAC)	M16170	10046960 REV A	Valeo Termico	NAME: SOU DATE:
PROJECT APPLICATION / CUSTOMER	CUSTOMER FN	ASSEMBLY PLANT	ORGANIZER	Project Manager or Change Leader	
FORD F-Series GTD	FORD		VEC SLP	GUILLELMO GUADARRAMA	7rding Lab / J.A. Riba or House 11

Change Description: Due to Condensation issue in vehicle (PV12-134)
 Production change validation for: C.A.C. -> Z7mm window Cover Plate added to Inlet and Outlet Header, Non Louverd Turbulators, gasket change (removal two ladder rungs)
 WPTS E 12559964 000
 BL34-9L440-AC

TEST	PROG NAME / REFERENCE	TEST DESCRIPTION	TEST FACILITY	ASSEMBLY / CONFIGURATION	TEST METHOD	TEST EQUIP.	TEST TYPE	START / (Interval)	COMPLETED (Interval)	STATUS	RESULT	REPORT No. / CODE	NOTES / (PRIMARY RESULTS FACTORS)		
1	CPS 0032 II A Class A	LEAK TEST Test cond. stat. Test case name: 207254 kPa (g) Test time: 20 sec (for prototype stage) Test medium: ambient compressed air	Valeo SLP	VALIDAT ON CAC P415 GTD: 57MA proposal (Plastic) (en)	PASS 100%	PV	ALL CAC	D	15 Aug 12	15 Aug 12	ALL CAC	D	OK	NA	LEAK CHECKED ON EOL

FUNCTIONAL TEST AND RESTRICTIONS

2	CPS 0032 IV A Class A	HEAT TRANSFER (WITH INTERNAL MASK) Change air flow: Q=0.288 Kg/s (50% On each part) Change air inlet temp = 125±1°C Change air inlet pressure = 200 Kpa A Ambient temp = 25°C Air Speed (5.7 m/s) = 1.08 Kg/s RESULTS WILL BE USED TO DEFINE NEW COOLING AND EFFECTIVENESS SPECIFICATION	Valeo SLP	Performance operation point 0.288 Kg/s @ 1.07 Kg/s CAC Effectiveness TSD % ± 5% Maximum Inlet Pressure Drop TSD kPa ± 10% 3 point matrix to be put in on the drawing: CAC Effectiveness and pressure drop Cooling air flow = 0.154 @ 0.42 = 1.08 kg/s Charge Air Flow = 0.12 @ 0.39 @ 0.288 kg/s	PASS 100%	PV	5 CAC	D	20 Aug 12	24 Aug 12	5	D	OK	TR 3003	<p>AVERAGE RESULTS FROM 5 SAMPLES TESTED:</p> <table border="1"> <tr> <th>HEAT REJECTION (Efficiency)</th> <th>AN VLOCITY (m/s)</th> <th>UP Inlet (m/s)</th> <th>AN VLOCITY (m/s)</th> <th>UP Inlet (m/s)</th> <th>DOWN AN FLOW (m/s)</th> </tr> <tr> <td>4.91</td> <td>3.23</td> <td>6.3</td> <td>6.3</td> <td>6.3</td> <td>6.3</td> </tr> </table> <table border="1"> <tr> <td>CHG ON (m/s)</td> <td>4.91</td> <td>3.23</td> <td>6.3</td> </tr> <tr> <td>CHG IN (m/s)</td> <td>6.3</td> <td>6.3</td> <td>6.3</td> </tr> <tr> <td>CHG OUT (m/s)</td> <td>6.3</td> <td>6.3</td> <td>6.3</td> </tr> </table>	HEAT REJECTION (Efficiency)	AN VLOCITY (m/s)	UP Inlet (m/s)	AN VLOCITY (m/s)	UP Inlet (m/s)	DOWN AN FLOW (m/s)	4.91	3.23	6.3	6.3	6.3	6.3	CHG ON (m/s)	4.91	3.23	6.3	CHG IN (m/s)	6.3	6.3	6.3	CHG OUT (m/s)	6.3	6.3	6.3				
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3	CPS 0032 IV A Class A	HEAT TRANSFER (WITH INTERNAL MASK AND 6 TUBE BLOCKER) Change air flow: Q=0.288 Kg/s (50% On each part) Change air inlet temp = 125±1°C Change air inlet pressure = 200 Kpa A Ambient temp = 25°C RESULTS WILL BE USED TO DEFINE NEW COOLING AND EFFECTIVENESS SPECIFICATION	Valeo SLP	Performance operation point 0.288 Kg/s @ 1.07 Kg/s CAC Effectiveness TSD % ± 5% Maximum Inlet Pressure Drop TSD kPa ± 10% 3 point matrix to be put in on the drawing: CAC Effectiveness and pressure drop Cooling air flow = 0.154 @ 0.42 = 1.08 kg/s Charge Air Flow = 0.12 @ 0.39 @ 0.288 kg/s	PASS 100%	PV	1 CAC	D	20 Aug 12	20 Aug 12	1	D	OK	TR 300X	<p>1 SAMPLE TESTED:</p> <table border="1"> <tr> <th>HEAT REJECTION (Efficiency)</th> <th>AN VLOCITY (m/s)</th> <th>UP Inlet (m/s)</th> <th>AN VLOCITY (m/s)</th> <th>UP Inlet (m/s)</th> <th>DOWN AN FLOW (m/s)</th> </tr> <tr> <td>4.91</td> <td>3.23</td> <td>6.3</td> <td>6.3</td> <td>6.3</td> <td>6.3</td> </tr> </table> <table border="1"> <tr> <td>CHG ON (m/s)</td> <td>4.91</td> <td>3.23</td> <td>6.3</td> </tr> <tr> <td>CHG IN (m/s)</td> <td>6.3</td> <td>6.3</td> <td>6.3</td> </tr> <tr> <td>CHG OUT (m/s)</td> <td>6.3</td> <td>6.3</td> <td>6.3</td> </tr> </table>	HEAT REJECTION (Efficiency)	AN VLOCITY (m/s)	UP Inlet (m/s)	AN VLOCITY (m/s)	UP Inlet (m/s)	DOWN AN FLOW (m/s)	4.91	3.23	6.3	6.3	6.3	6.3	CHG ON (m/s)	4.91	3.23	6.3	CHG IN (m/s)	6.3	6.3	6.3	CHG OUT (m/s)	6.3	6.3	6.3				
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4	CPS 0032 IV G Class B (See description)	HOT AGE TEST Chamber Temperature = 185C ± 5.0 C Interval of 296° C All Parts will be used for Flow to Blow off Outlet Plate	Valeo SLP	The CAC shall not develop a temporary leakage that exceed a leak rate of 500 cc/min at 207 kPa after restoring min time hold required. Minimum Inlet side: 200 hrs Minimum Inlet Outlet side: 75 hrs	PASS 100%	PV	2 CAC	D	17 Aug 12	28 Aug 12	2	D	OK	TR 300X	<table border="1"> <tr> <th>SAMPLED</th> <th>IN HOURS</th> <th>TE HOURS</th> <th>TOTAL HOURS</th> <th>LEAK RATE</th> <th>COMMENTS</th> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>NO LEAKS DETECTED</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>NO LEAKS DETECTED</td> </tr> </table>	SAMPLED	IN HOURS	TE HOURS	TOTAL HOURS	LEAK RATE	COMMENTS	0	0	0	0	0	NO LEAKS DETECTED	1	0	0	0	0	NO LEAKS DETECTED										
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5	Valeo PCD 1703 PCD 1714	Vibration test T4 Axial test Road Load data from CPS or MP Q loading	Valeo Air	Minimum Inlet: Two 80 cycles (206 hrs) After completion the CAC shall have no distortion and no cracks be fully functional and meet the criteria of the Leak test. This will be applied just to the CAC area Test to prove the performance of tank and header due to the weight added	PASS 100%	PV	2 CAC	D	17 Aug 12	28 Aug 12	2	D	OK	TR 300X	<p>SAMPLED TOTAL OF LEAK RATE</p> <table border="1"> <tr> <th>BEFORE</th> <th>AFTER TEST</th> <th>TEST PERFORMED WITH FINAL MUFFLER AND INTERNAL PLASTIC COVER</th> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> </table> <p>NOTE: AFTER REVIEW THE SIGNAL WITH PLASTIC COVER & SEAL ON RELEASE AFTER THE TEST</p>	BEFORE	AFTER TEST	TEST PERFORMED WITH FINAL MUFFLER AND INTERNAL PLASTIC COVER	0	0	0																						
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6	No Spec associated	Pull Off Force (Cover will be pulled from header after 30 seconds) Recorded as Newton force required to pull cover from the 30 sec (from 10 sec) Rate: 5 N / 1 mm/s Test part as completed (R) Test after 1hr heat (R) Pre heating Chamber Temperature = 185C ± 5.0 C Will be performed just on cores	Valeo SLP	Pre Heating NO LEAK TEST REQUIRED The core must meet the requirement of min sum of 200 hrs New test so no criteria published at this time RECORD	PASS 100%	PV	12 CORE	D	17 Aug 12	29 Aug 12	12	D	OK	TR CAC P415	<p>CONTROL & LOCATIONS SEE PICTURE FOR MORE DETAIL</p> <p>BEFORE HOT AGE TEST</p> <table border="1"> <tr> <th>SAMPLED</th> <th>MAXIMUM FORCE (N)</th> </tr> <tr> <td>SAM 1</td> <td>1560</td> </tr> <tr> <td>SAM 2</td> <td>726</td> </tr> <tr> <td>SAM 3</td> <td>1065</td> </tr> <tr> <td>SAM 4</td> <td>864</td> </tr> <tr> <td>SAM 5</td> <td>736</td> </tr> <tr> <td>SAM 6</td> <td>1038</td> </tr> </table> <p>AFTER HOT AGE TEST</p> <table border="1"> <tr> <th>SAMPLED</th> <th>MAXIMUM FORCE (N)</th> </tr> <tr> <td>SAM 1</td> <td>1561</td> </tr> <tr> <td>SAM 2</td> <td>2311</td> </tr> <tr> <td>SAM 3</td> <td>1060</td> </tr> <tr> <td>SAM 4</td> <td>2253</td> </tr> <tr> <td>SAM 5</td> <td>1328</td> </tr> <tr> <td>SAM 6</td> <td>2041</td> </tr> </table>	SAMPLED	MAXIMUM FORCE (N)	SAM 1	1560	SAM 2	726	SAM 3	1065	SAM 4	864	SAM 5	736	SAM 6	1038	SAMPLED	MAXIMUM FORCE (N)	SAM 1	1561	SAM 2	2311	SAM 3	1060	SAM 4	2253	SAM 5	1328	SAM 6	2041
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PE13-018 031299






PRODUCT VALIDATION PLAN & REPORT

OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eGRV - STMA proposal (Plastic tanket)

PLM control:	PAPER No:	PV12 134	REVISION No:	9
ECDF:	ORIG DATE:	27 May 11	DATE REV:	27 Aug 12
PPDR #:	N/A	APPROVAL:		
PPDR #:	N/A	Project Manager / R. K. Kofke		

MODEL YEAR	COMPONENT / ASBY	VALID FR	DRAWING A REV	SUPPLIER NAME	CUSTOMER APPROVAL		
2013	Charger Cooler (CAC)	M165170	10046960 REV A	Valeo Termico	NAME	SGN	DATE
PROJECT APPLICATION (S)	CUSTOMER	CUSTOMER P#	ASSEMBLY PLANT	ORIGINATOR	Project Manager or Change Leader		
FORD F-Series GTR	FORD		VEC SLP	GUILLELMO GUADARRAMA	Testing Lab: J.A. Ribera House 11		

7	No Spec associated		Valeo SLP	Cover must fit be attached to be tubes	PAS 100%	PV	2	CAC	D	28 Aug 12	28 Aug 12	2	D	OK	TR 1000X	<p>REPORT UNDER CREATION</p> <p>AFTER HD TAGE TEST</p> <p>SAMPLE ID: FLOW+1000 high h @170c</p> <p>SAM 1: PASB COMMENTS: AFTER FLOW APPL. ED NO PLASTIC COVER DETY ASHMENT</p> <p>SAM 2: PASB COMMENTS: AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT</p>   
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PROCEURE	TEST DEVICE PT ON	ACCEPTANCE CRITERIA	TARGET RESULT	TEST STAGE	SAMPLES TO BE TESTED	SAMPLE TYPE	ACTUAL RESULT
DEV COPY THE GOVERNING TEST PROCEDURE OR STANDARD	PROCEURE BRIEF DESCRIPTION OF EACH TEST	SPC CYCLES MISE VOLT S MINIMUM VALUES NO FAILURES ETC.	RELIABILITY OR NO FAILURE	ED: PROTOTYPING DESIGN DV: DESIGN VALIDATION PV: PRODUCTION VALIDATION DC: CONTINUOUS CONFORMANCE	LIST QUANTITY TESTED & PLUS TYPE ETC	A: PROTOTYPE B: PROTOTYPE (TOOLING) C: PRODUCTION D: INITIAL PRODUCTION	LIST ISSUES IN TERMS OF ED: PROTOC PASS OR NO FAILURE NR OF CYCLES WITH OR WITHOUT FAILURE

Rev	Date	Change description / REASON
1	27 May 11	PAPR released for customer approval
2	04 Oct 11	1) Use Age added per customer request 2) Comments added
3	14 May 12	1) Interim PV added 2) Comments added
4	12 Jun 12	1) Complete PV12 08 at 10 days
5	30 Jul 12	1) Complete PV11 08 at 5 days 2) PV12 Transition
6	13 Aug 12	1) Addition of PV12 02: Basing process on a tentative one for CAC P415 and New Cooling process validation due to volume increase 2) Addition of PV12 04: 27mm radiator Cooler Flow added to test and Characterize Non Low end Tubulars: gasket change
7	15 Aug 12	1) Addition of Flow to Blowoff Older plate
8	23 Aug 12	1) Define testing
9	27 Aug 12	2) Complete PV12

PE13-018 031300

PE13-018

FORD

8-23-2013

APPENDIX G

Engineering Review

12

From: Guillermo GUADARRAMA [guillermo.guadarrama@valeo.com]
Sent: Friday, August 31, 2012 4:17 PM
To: Tyler, Jim (J.S.); Kramer, Michael (M.T.)
Cc: David CASTILLO
Subject: Re: PVP&R for CAC P415 with Plastic Internal Cover.
Attachments: PVP&R CAC P415 NEW CAC eCBV Ford Hystorical changes-7.pdf

Jim/Mike,

The complete PV is attached.

Could you please sign it and send it back to me ?

This is with historical.

Thanks.

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
mail: guillermo.guadarrama@valeo.com

On Wed, Aug 29, 2012 at 7:31 PM, Guillermo GUADARRAMA <guillermo.guadarrama@valeo.com> wrote:
Jim/Mike,

Attached you will find the pictures after vibration test.

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
mail: guillermo.guadarrama@valeo.com

On Tue, Aug 28, 2012 at 1:53 PM, Guillermo GUADARRAMA <guillermo.guadarrama@valeo.com> wrote:
Jim/Mike,

Attached you will find the PVP&R with you requests and with the final test comeleted (Flow Blow Test)

We are preparing the reports.

Thanks.

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
mail: guillermo.guadarrama@valeo.com

On Mon, Aug 27, 2012 at 5:41 PM, Guillermo GUADARRAMA <guillermo.guadarrama@valeo.com> wrote:
Jim/Mike,

After our meeting I already fix some points that you requested.

I am still missing the 6 tube blocker report and the pictures from the vibration test after un-crimp the tanks.

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
mail: guillermo.guadarrama@valeo.com

On Mon, Aug 27, 2012 at 3:00 PM, Guillermo GUADARRAMA <guillermo.guadarrama@valeo.com> wrote:
Jim/Mike,

I am sending you the preliminary PVP&R cover sheet.

This include all results except the Flow blow test that is going to be performed tonight.

Please review it and send me your comments.

Regards/Saludos,

Guillermo Guadarrama
Valeo Engine Cooling, SLP
Eje 130 Esq. C.F.E.
CP 78395 AP 6-082
San Luis Potosi, Mexico
Tel: +52 (444) 826-66-00, Ext. 6229
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at the above address and destroy it.



PRODUCT VALIDATION PLAN & REPORT

****CONFIDENTIAL****
OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eCRV, 57MA proposal (Plastic tanks)

PLM control:	PVPM No:	PV12 134	REVISION No:	9
ECOS	ORIGIN DATE:	27 May 11	DATE REV:	27 Aug 12
PPCR #:	N/A	APPROVAL		
PPDR #:	N/A			

MODEL YEARS:	COMPONENT / ASBY:	VALEO PN	DRAWING & REV	SUPPL. EX NAME:	CUSTOMER APPROVAL:
2013	Charger Cooler (CAC)	M165170	100046940 REV A	Valeo Termico	
PROJECT APPL. CATION (S)	CUSTOMER:	CUSTOMER PN	ASSEMBLY PLANT:	DIRECTION:	NAME
FORD F Series GTDI	FORD		VEC SLP	GUILERMO GUADARRAMA	SEN
					DATE

RAI Manager / R. Sanchez	Due to Site Manager / K. Madais
PI PNs Coordinator E. Berrea	Project Manager or Change Leader
Testing Lab / J.A.Rico or Roman U	Other /

TEST PLAN

TEST REPORT

BL34-9L440-AC, Baseline
 New Part number DL34-9L440-AB
 INTERIM - PV (PV12-099)
 WPTS E 12495488 000

NON FUNCTIONAL TESTING

ITEM	PROCEDURE / STANDARD	TEST DESCRIPTION	TEST FACILITY	ACCEPTANCE CRITERIA	TARGET REQUIRED	TEST STAGE	SAMPLES		TIMING		SAMPLING TESTED		ACTUAL RESULT		NOTES / SUMMARY RESULTS / ACTIONS
							QTY	TYPE	START (dd/mm/aa)	COMPLETED (dd/mm/aa)	QTY	TYPE	RESULT	REPORT No / CODE	
1	CPS 0032 III A Class A	LEAK TEST Test conditions Test pressure 207±14 kPa (g) Test time 20 sec (for prototype stage) Test medium: ambient compressed air	Valeo SLP	VALIDATION CAC P415 GTDI, 57MA proposal (Plastic tanks)	PASS 100%	PV	ALL	D	30 Jun 12	30 Jun 12	ALL	D	OK	N/A	LEAK CHECKED ON EOL

FUNCTIONAL TEST AND RESTRICTIONS

2	CPS 0032, IV A Class A	HEAT TRANSFER Charge side Q' 0.288 Kg/s (50% On each port) Charge air inlet temp. 125±1 °C Charge air inlet pressure 200 Kpa A Ambient temp. 25°C Air Speed (5.7 m/s) 1.08 Kg/s The test has to be performed with the muffler assembly (O Ring + valve + Muffler)	Valeo SLP	Performance operation point 0.288 Kg/s/1.07 Kg/s CAC Effectiveness TBD % ± 5% Maximum Internal Pressure Drop TBD kPa ± 10% 9 point matrix to be printed on the drawing, CAC Effectiveness and pressure drop Cooling air flow 0.154, 0.62, 1.08 kg/s Ambient temp. 25°C ± 2°C range	PASS 100%	PV	5	D	2 Jun 12	7 Jun 12	5	D	OK	TR 5254	<p>* PERFORMANCE COMPARISON OR DEGRADATION MUST BE COMPARED vs BASELINE BL34 9L440 AB.</p> <p>* AVERAGE RESULTS FROM 5 SAMPLES TESTED</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"> <p>BL34 9L440-AB</p> <p>CHANGE AIR PRESSURE: 1.08 kg/s T CHARGE SIDE: 125 ± 1 °C AMBIENT: 25 ± 1 °C HEAT TRANSFER (KW)</p> <table border="1"> <tr><th colspan="2">COOLING AIR FLOW (kg/s)</th><th colspan="2">CAC Effectiveness (%)</th></tr> <tr><td>0.154</td><td>0.62</td><td>100</td><td>100</td></tr> <tr><td>0.154</td><td>0.62</td><td>73.3</td><td>80.1</td></tr> <tr><td>0.154</td><td>0.62</td><td>50.0</td><td>62.4</td></tr> <tr><td>0.154</td><td>0.62</td><td>40.4</td><td>74.0</td></tr> <tr><td>0.154</td><td>0.62</td><td>70.4</td><td>149.3</td></tr> </table> </div> <div style="border: 1px solid black; padding: 5px;"> <p>DL34-9L440-AB</p> <p>CHANGE AIR PRESSURE: 1.08 kg/s T CHARGE SIDE: 125 ± 1 °C AMBIENT: 25 ± 1 °C HEAT TRANSFER (KW)</p> <table border="1"> <tr><th colspan="2">COOLING AIR FLOW (kg/s)</th><th colspan="2">CAC Effectiveness (%)</th></tr> <tr><td>0.154</td><td>0.62</td><td>100</td><td>100</td></tr> <tr><td>0.154</td><td>0.62</td><td>73.3</td><td>85.1</td></tr> <tr><td>0.154</td><td>0.62</td><td>60.7</td><td>68.8</td></tr> <tr><td>0.154</td><td>0.62</td><td>60.7</td><td>70.2</td></tr> <tr><td>0.154</td><td>0.62</td><td>44.1</td><td>134.3</td></tr> </table> </div> </div>	COOLING AIR FLOW (kg/s)		CAC Effectiveness (%)		0.154	0.62	100	100	0.154	0.62	73.3	80.1	0.154	0.62	50.0	62.4	0.154	0.62	40.4	74.0	0.154	0.62	70.4	149.3	COOLING AIR FLOW (kg/s)		CAC Effectiveness (%)		0.154	0.62	100	100	0.154	0.62	73.3	85.1	0.154	0.62	60.7	68.8	0.154	0.62	60.7	70.2	0.154	0.62	44.1	134.3
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3	CPS 0032, IV E Class B (See exception)	HOT PRESSURE CYCLE Cycle pressure 0 to 190 kPa g ± 21 Kpa, instead of 210 KPa Charge Inlet Temperature 185°C/5°C instead of 205°C/5 °C Test Medium Compressed Air Cycle Rate 50 cycles/min (± 10 Cycles/min) The test has to be performed with the muffler assembly provided by FORD	Valeo SLP	375,000 MINIMUM CYCLES to pass the test specification	PASS 100%	PV	4	D	31 May 12	6 Jun 12	4	D	OK	TR 5252	<p>SAMPLE ID Minimum of Cycles TOTAL CYCLES OBSERVATIONS</p> <p>LB121253 375,000 TESTED</p> <p>LB121354 0.0 375,000 NO LEAKS WERE DETECTED DURING THE TESTING</p> <p>LB121279 0.0 375,000 NO LEAKS WERE DETECTED DURING THE TESTING</p> <p>LB121290 0.0 375,000 NO LEAKS WERE DETECTED DURING THE TESTING</p>																																																
4	CPS 0032, IV G Class A	PROOF PRESSURE / BURST Pressure 300 Kpa ± 21 kPa Ramp Time 10 sec ± 0.5 sec Hold time Min 30 sec Test Medium Water Test Medium Water	Valeo SLP	RECORD Sample CAC must meet the acceptance requirement for leak test III A No fin collapse or tube deformation before 300 Kpa Test acceleration/Burst Increased pressure at a slow rate until leakage occurs	PASS 100%	PV	5	D	6 Jun 12	11 Jun 12	5	D	OK	TR 5251	<p>Sample Leak @ 300 kPa (30sec) Burst Pressure (kPa / PS) Observations</p> <p>LB121315 OK 662 / 99 LEAK ON CRIMPING, OUTLET TANK</p> <p>LB121316 OK 738 / 107 TOTAL DETACHMENT OUTLET TANK</p> <p>LB121317 OK 676 / 98 LEAK ON CRIMPING, OUTLET TANK</p> <p>LB121318 OK 662 / 96 LEAK ON CRIMPING, OUTLET TANK</p> <p>LB121319 OK 772 / 112 LEAK ON CRIMPING, OUTLET TANK</p>																																																
5	CPS 0032, IV G Class B (See exception)	HOT AGE TEST Chamber Temperature 185°C ± 5 °C, instead of 205 °C	Valeo SLP	The CAC shall not develop a crimp or tank leakage that exceed a leak rate of 500 cc/min at 207 kPa after enduring min. time requirement. Minimum life Inlet side 200 hrs Minimum life Outlet side 7.5 hrs	PASS 100%	PV	2	D	25 May 12	11 Jun 12	2	D	OK	TR 5253	<p>Sample 200 Hours (Inlet side) 75 Hours (Outlet side) Leak Rate after testing (500 cc/min max) Observations</p> <p>LB121281 OK OK 480 cc/min Leak on crimping outlet tank below the maximum allowed.</p> <p>LB121282 OK OK 0.0 cc/min No leaks detected during or after testing</p>																																																

BL34-9L440-AC, Baseline
 New Part number DL34-9L440-AB (PV11-081)
 WPTS E 12495488 000

NON FUNCTIONAL TESTING

ITEM	PROCEDURE / STANDARD	TEST DESCRIPTION	TEST FACILITY	ACCEPTANCE CRITERIA	TARGET REQUIRED	TEST STAGE	SAMPLES		TIMING		SAMPLING TESTED		ACTUAL RESULT		NOTES / SUMMARY RESULTS / ACTIONS
							QTY	TYPE	START (dd/mm/aa)	COMPLETED (dd/mm/aa)	QTY	TYPE	RESULT	REPORT No / CODE	
1	CPS 0032 III A Class A	LEAK TEST Test conditions Test pressure 207±14 kPa (g) Test time 20 sec (for prototype stage) Test medium: ambient compressed air	Valeo SLP	VALIDATION CAC P415 GTDI, 57MA proposal (Plastic tanks)	PASS 100%	PV	ALL	D	9 Jul 12	9 Jul 12	20	D	OK	N/A	Baseline test leak test on EOL, adjusted to 5.9 Kpa

PE13-018 031304



PRODUCT VALIDATION PLAN & REPORT
 CONFIDENTIAL
OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eCBV, 57 MA proposal (Plastic tanks)

PLM control:	PVPR No: PV12 134	REVISION No: 9
ECOM:	ORIGIN DATE: 27 May 11	DATE REV: 27 Aug 12
PCR #: N/A	APPROVAL:	
PRD #: N/A	R&D Manager / R. Sanchez	Qual by Site Manager / K. Holter

MODEL YEARS:	COMPONENT / ASSY:	VALEO P/N:	DRAWING & REV:	SUPPL. SR NAME:	CUSTOMER APPROVAL:
2013	Charger Cooler (CAC)	M165170	100046940 REV A	Valeo Termico	NAME: SIGN: DATE:
PROJECT APPLICATION(S):	CUSTOMER:	CUSTOMER P/N:	ASSEMBLY PLANT:	ORIGINATOR:	PI P/Ns Coordinator / E. Barba
FORD F Series GTDI	FORD		VEC SLP	GULLERMO GUADARRAMA	Project Manager or Change Leader
					Testing Lab / J.A.Rico or Honor U
					Other: /

2	CPS 0032, III B, Class A	INTERNAL CLEANLINESS (Surrogate data from BL34 BL440 AB)	Valeo SLP	CAC must meet internal surface SAE J1726 requirements Max weight: 25 mg Maximum particle size: 3.175 mm Maximum particle area: 2.08 mm ² non ferrous metal particle size < 65mm, sand < 6.3mm	PASS 100%	PV	2	D	22 Oct 10	25 Oct 12	2	D	OK	TR 4743	Data averaged from BL34 BL440 AB Max weight: Sample 1 > 12.3 mg, Sample 2 > 17.9 mg Maximum particle size: Sample 1 > 0.432 mm, Sample 2 > 0.347 mm Maximum particle area: Sample 1 > 0.2349 mm ² , Sample 2 > 0.5483 mm ²
3	CPS 0032, III C, Class A	INTERNAL VOLUME	Valeo SLP	RECORD	N/A	PV	2	D	20 Jul 12	20 Jul 12	2	D	OK	TR 9291	VOLUME (cm ³) SAMPLE 1 3960 SAMPLE 2 3760
4	CPS 0032, III D, Class A	WEIGHT	Valeo SLP	RECORD	N/A	PV	2	D	20 Jul 12	20 Jul 12	2	D	OK	TR 9291	WEIGHT (gr) SAMPLE 1 3800 SAMPLE 2 3800

FUNCTIONAL TEST AND RESTRICTIONS

5	CPS 0032, IV A, Class A	HEAT TRANSFER Charge side Q' 0.288 Kg/s (50% On each port) Charge air inlet temp 125±1 °C Charge air inlet pressure 200 Kpa A Ambient temp 25°C Air Speed (5.7 m/s) 1.08 Kg/s The test has to be performed with the muffler assembly (O Ring + valve + Muffler)	Valeo SLP	Performance operation point 0.288 Kg/s/1.07 Kg/s CAC Effectiveness 81.4 ± 0% Maximum Internal Pressure Drop 5.81 kPa ± 10% 3 point matrix to be printed on the drawing, CAC Effectiveness and pressure drop Cooling air flow 0.154, 0.62, 1.08 kg/s Charge Air Flow 0.12, 0.19 & 0.288 kg/s	PASS 100%	PV	5	D	17 Jul 12	20 Jul 12	5	D	OK	TR 5304	* PERFORMANCE COMPARISON OR DEGRADATION MUST BE COMPARED vs BABELME BLM BL440 AB * AVERAGE RESULTS FROM 5 SAMPLES TESTED <table border="1"> <tr> <th colspan="2">HEAT EXTRACTOR (EFFICIENCY %)</th> <th colspan="3">AIR VELOCITY (m/s)</th> </tr> <tr> <td>0.81</td> <td>3.27</td> <td>5.7</td> <td></td> <td></td> </tr> <tr> <td>0.92</td> <td>7.0</td> <td>10.4</td> <td></td> <td></td> </tr> </table> <table border="1"> <tr> <th colspan="2">OPERATED AIR (Pa)</th> <th colspan="3">AIR VELOCITY (m/s)</th> </tr> <tr> <td>0.81</td> <td>3.27</td> <td>5.7</td> <td></td> <td></td> </tr> <tr> <td>0.91</td> <td>7.03</td> <td>10.6</td> <td></td> <td></td> </tr> </table> <table border="1"> <tr> <th colspan="2">INTERNAL AIR FLOW (kg/h)</th> <th colspan="3">CHARGE AIR FLOW (kg/h)</th> </tr> <tr> <td>1.08</td> <td>0.64</td> <td>0.64</td> <td>0.67</td> <td>0.67</td> </tr> <tr> <td>1.07</td> <td>1.41</td> <td>1.41</td> <td>1.41</td> <td>1.41</td> </tr> </table>	HEAT EXTRACTOR (EFFICIENCY %)		AIR VELOCITY (m/s)			0.81	3.27	5.7			0.92	7.0	10.4			OPERATED AIR (Pa)		AIR VELOCITY (m/s)			0.81	3.27	5.7			0.91	7.03	10.6			INTERNAL AIR FLOW (kg/h)		CHARGE AIR FLOW (kg/h)			1.08	0.64	0.64	0.67	0.67	1.07	1.41	1.41	1.41	1.41
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6	CPS 0032, IV E (See exception)	HOT PRESSURE CYCLE Cycle pressure 0 to 150 kPa g ± 21 Kpa, instead of 210 KPa Charge Inlet Temperature 205C±5 0C Test Medium Compressed Air Cycle Rate 50 cycles/min (± 10 Cycles/min) The test has to be performed with the muffler assembly provided by FORD	Valeo GREEN	375,000 MINIMUM CYCLES to pass the test specification	PASS 100%	PV	4	D	13 Jul 12	24 Jul 12	4	D	OK	GB 120582	REPORT UNDER CREATION <table border="1"> <tr> <th>SAMPLE ID</th> <th>Minimum of Cycles</th> <th>LEAK RATE</th> <th>OBSERVATIONS</th> </tr> <tr> <td>105845</td> <td>375 000</td> <td>0 cm</td> <td>No Leak Detected</td> </tr> <tr> <td>105847</td> <td>Set factory</td> <td>0 cm</td> <td>No Leak Detected</td> </tr> <tr> <td>105848</td> <td>Set factory</td> <td>0 cm</td> <td>0 gal LOSS SMALL CRIMP LEAK ON TOP GRILLE SIDE</td> </tr> <tr> <td>105849</td> <td>Set factory</td> <td>0 cm</td> <td>0 gal LOSS SMALL CRIMP LEAK ON MIDDLE ENGINE SIDE</td> </tr> </table>	SAMPLE ID	Minimum of Cycles	LEAK RATE	OBSERVATIONS	105845	375 000	0 cm	No Leak Detected	105847	Set factory	0 cm	No Leak Detected	105848	Set factory	0 cm	0 gal LOSS SMALL CRIMP LEAK ON TOP GRILLE SIDE	105849	Set factory	0 cm	0 gal LOSS SMALL CRIMP LEAK ON MIDDLE ENGINE SIDE																									
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7	CPS 0032, IV F (See exception)	THERMAL CYCLE (Surrogate data from BL34 BL440 AB) Cold charge air temp: 20±0°C Hot charge temp: 145C ±5 0°C Charge air flow (cold/hot) 18 ± 2.0 Kg/min Cycle rate (equal hot & cold): 30 ± 2.0 cycles/hour Ambient air face velocity 2 ± 0.5 m/s Ambient Air Temperature 30 ± 1°C	Valeo SLP	5,000 MINIMUM CYCLES to pass the test specification	PASS 100%	PV	2	D	18 Oct 10	28 Oct 10	2	D	OK	TR 4342	Data averaged from BL34 BL440 AB After 7,000 cycles the test was accelerated by turning off the ambient airflow, and continued up to 8,000 cycles. At 8,000 cycles leak to it was performed and no leaks detected. Test was stopped at the end of 8,000 cycles																																													
8	CPS 0032, IV G, Class A	PROOF PRESSURE / BURST Pressure 300 Kpa ± 21 kPa Ramp Time 10 sec ± 3.0 sec Hold time Min 30 sec Test Medium Water Test Medium Water The test has to be performed with the muffler assembly	Valeo SLP	RECORD Sample CAC must meet the acceptance requirement for leak test III A No fin collapse or tube deformation before 300 Kpa Test acceleration/Burst Increased pressure at a slow rate until leakage occurs	PASS 100%	PV	5	D	16 Jul 12	19 Jul 12	5	D	OK	TR 5302	<table border="1"> <tr> <th>Sample</th> <th>Leak @ 300 kPa (30sec)</th> <th>Burst Pressure (kPa / PSi)</th> <th>Observations</th> </tr> <tr> <td>LB121783</td> <td>OK</td> <td>718 / 103</td> <td></td> </tr> <tr> <td>LB121784</td> <td>OK</td> <td>738 / 107</td> <td>LEAK ON CRIMPING OUTLET TANK</td> </tr> <tr> <td>LB121785</td> <td>OK</td> <td>758 / 110</td> <td>LEAK ON CRIMPING OUTLET TANK</td> </tr> <tr> <td>LB121786</td> <td>OK</td> <td>763 / 110</td> <td>LEAK ON CRIMPING OUTLET TANK</td> </tr> <tr> <td>LB121787</td> <td>OK</td> <td>758 / 110</td> <td>LEAK ON CRIMPING OUTLET TANK</td> </tr> </table>	Sample	Leak @ 300 kPa (30sec)	Burst Pressure (kPa / PSi)	Observations	LB121783	OK	718 / 103		LB121784	OK	738 / 107	LEAK ON CRIMPING OUTLET TANK	LB121785	OK	758 / 110	LEAK ON CRIMPING OUTLET TANK	LB121786	OK	763 / 110	LEAK ON CRIMPING OUTLET TANK	LB121787	OK	758 / 110	LEAK ON CRIMPING OUTLET TANK																					
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9	CPS 0032, IV G, Class B (See exception)	HOT AGE TEST Chamber Temperature 185C ± 5 0C, instead of 205 °C The test has to be performed with the muffler assembly provided by FORD (O Ring + valve + Muffler)	Valeo SLP	The CAC shall not develop a crimp or tank leakage that exceed a leak rate of 500 ccm/h at 2.07 kPa after enduring min. time requirement Minimum life Inlet side 200 hrs Minimum life Outlet side 75 hrs	PASS 100%	PV	2	D	16 Jul 12	30 Jul 12	2	D	OK	TR 5312	<table border="1"> <tr> <th>SAMPLE ID</th> <th>200 HOURS (INLET SIDE)</th> <th>75 HOURS (OUTLET SIDE)</th> <th>TOTAL OF HOURS TESTED</th> <th>LEAK RATE AFTER TEST</th> <th>COMMENTS</th> </tr> <tr> <td>LB121753</td> <td>OK</td> <td>OK</td> <td>201</td> <td>0.0</td> <td>NO LEAKS DETECTED</td> </tr> <tr> <td>LB121754</td> <td>OK</td> <td>OK</td> <td>201</td> <td>0.0</td> <td>NO LEAKS DETECTED</td> </tr> </table>	SAMPLE ID	200 HOURS (INLET SIDE)	75 HOURS (OUTLET SIDE)	TOTAL OF HOURS TESTED	LEAK RATE AFTER TEST	COMMENTS	LB121753	OK	OK	201	0.0	NO LEAKS DETECTED	LB121754	OK	OK	201	0.0	NO LEAKS DETECTED																											
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10	VEC REC 20012 Rev A	(Surrogate data from BL34 BL440 AB) Metalurgical Analysis / Braze quality	Valeo SLP	The CAC shall meet the minimum requirement requested on VEC REC 0012 specification	PASS 100%	PV	2	D	22 Oct 10	26 Oct 12	2	D	OK	TR 4744	Data averaged from BL34 BL440 AB OK, samples meet 100% braze quality evaluation per VEC REC 0012 Rev A																																													
11	CPS 0031, IV I, Class A	EXTERNAL CORROSION (Surrogate data from BL34 BL440 AB) Test conditions: ASTM G85 A3 (SWAAT)	Valeo SLP	The CAC shall meet the acceptance requirement for leak test III A (Pressure lower loss than 17.2 kPa), after enduring minimum of 21 days Use surrogate data from AL34 GR75 AA (±21 days)	PASS 100%	PV	0	D	N/A	N/A	N/A	N/A	OK	TR 3770	Data averaged from BL34 BL440 AB <table border="1"> <tr> <th>Sample</th> <th>Hours Tested</th> <th>Leak after testing (gal / sec)</th> <th>Comments</th> </tr> <tr> <td>LB 2150</td> <td>504</td> <td>0.0</td> <td>No leaks were detected during or after testing</td> </tr> <tr> <td>LB 3151</td> <td>504</td> <td>0.0</td> <td>No leaks were detected during or after testing</td> </tr> </table>	Sample	Hours Tested	Leak after testing (gal / sec)	Comments	LB 2150	504	0.0	No leaks were detected during or after testing	LB 3151	504	0.0	No leaks were detected during or after testing																																	
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PE13-018 031305



PRODUCT VALIDATION PLAN & REPORT

OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eCBV, 57MA proposal (Plastic tanks)

PLM control:	PVPR No: PV12 134	REVISION No: 9
ECOM:	ORIGIN DATE: 27 May 11	DATE REV: 27 Aug 12
PCR #: N/A	APPROVAL:	
PDR #: N/A	RAD Manager / R. Sanchez	Qual by Site Manager / K. Hoxha

MODEL YEARS:	COMPONENT / ASSY:	VALEO P/N	DRAWING & REV	SUPPL. SR NAME:	CUSTOMER APPROVAL:		
2013	Charger Cooler (CAC)	M165170	100046940 REV A	Valeo Termico	NAME	SIGN	DATE
PROJECT APLICATION (S)	CUSTOMER:	CUSTOMER P/N	ASSEMBLY PLANT:	ORIGINATOR:			
FORD F Series GTDI	FORD	[REDACTED]	VEC SLP	GUILLEMO GUADRARRAMA			

PI P/Ns Coordinator / E. Barba	Project Manager or Change Leader
Testing Lab / J. A. B. de Honor U	Other: /

12	Valeo PCD 1703, PCD 1714	Vibration test Tri Axial test Road Load data from DPG or MPG testing The test has to be performed with the muffler assembly provided by FORD. (O Ring + valve + Muffler)	Valeo AH	Minimum hours: Two life cycles (206 hrs.) After completion, the CAC shall have no distortion and no cracks, be fully functional and meet the criteria of the Leak test. This will be applied just to the CAC area. Test to prove the performance of tank and header due to the weight added	PASS 100%	PV	2	D	20 Jul 12	30 Jul 12	2	D	OK	TR 56044	<p>REPORT UNDER CREATION</p> <table border="1"> <tr> <th>SAMPLE ID</th> <th>TOTAL OF HOURS</th> <th>LEAK RATE AFTER TEST</th> <th>COMMENTS</th> </tr> <tr> <td>63922</td> <td>206</td> <td>0.0</td> <td>TEST PERFORMED WITH FINAL MUFFLER</td> </tr> <tr> <td>63923</td> <td>206</td> <td>0.0</td> <td>TEST PERFORMED WITH FINAL MUFFLER</td> </tr> </table>	SAMPLE ID	TOTAL OF HOURS	LEAK RATE AFTER TEST	COMMENTS	63922	206	0.0	TEST PERFORMED WITH FINAL MUFFLER	63923	206	0.0	TEST PERFORMED WITH FINAL MUFFLER
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63922	206	0.0	TEST PERFORMED WITH FINAL MUFFLER																								
63923	206	0.0	TEST PERFORMED WITH FINAL MUFFLER																								

Change Description: Due to Condensation issue in vehicle (PV12-134)
Production change validation for: C.A.C. -> 27mm window Cover Plate added to Inlet and Outlet Header, Non Louvered Turbulators, gasket change (removal two ladder rungs)
 WPTS E 12559964 000
 DL34-9L440-AC

NON FUNCTIONAL TESTING

ITEM	PROCEDURE / STANDARD	TEST DESCRIPTION	TEST FACILITY	ACCEPTANCE CRITERIA	TARGET REQUIRED	TEST STAGE	SAMPLES		TIMING		SAMPLING TESTED		ACTUAL RESULT		NOTES / SUMMARY RESULTS / ACTIONS
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1	CPS 0032 III A Class A	LEAK TEST Test conditions Test pressure: 207±14 kPa (g) Test time: 30 sec (for prototype stage) Test medium: ambient compressed air	Valeo SLP	VALIDATION CAC P415 GTDI, 57MA proposal (Plastic tanks)	PASS 100%	PV	ALL CAC	D	15 Aug 12	15 Aug 12	ALL CAC	D	OK	NA	LEAK CHECKED ON EOL

FUNCTIONAL TEST AND RESTRICTIONS

2	CPS 0032, IV A Class A	HEAT TRANSFER (WITH INTERNAL MASK) Charge side Q' 0.288 Kg/s (50% On each port) Charge air inlet temp: 125±1 °C Charge air inlet pressure: 200 Kpa A Ambient temp: 25°C Air Speed (5.7 m/s) 1.08 Kg/s RESULTS WILL BE USED TO DEFINE NEW COOLING AND EFFECTIVENESS SPECIFICATION	Valeo SLP	Performance operation point 0.288 Kg/s/1.07 Kg/s CAC Effectiveness TBD % ± 5% <u>Minimum Internal Pressure Drop</u> TBD kPa ± 10% 9 point matrix to be printed on the drawing, CAC Effectiveness and pressure drop Cooling air flow 0.154, 0.62, 1.08 kg/s Charge Air Flow 0.12, 0.19 & 0.288 kg/s	PASS 100%	PV	5 CAC	D	20 Aug 12	24 Aug 12	5	D	OK	TR 5363	<p>AVERAGE RESULTS FROM 5 SAMPLES TESTED</p> <table border="1"> <tr> <th rowspan="2">HEAT REJECTION (EFFICIENCY %)</th> <th colspan="3">AIR VELOCITY (m/s)</th> </tr> <tr> <td>0.81</td> <td>3.27</td> <td>5.7</td> </tr> <tr> <td>432</td> <td>55.2</td> <td>77.5</td> <td>83.5</td> </tr> <tr> <td>CAPR OF AIR FLOW (kg/s)</td> <td>644</td> <td>540</td> <td>580</td> <td>753</td> </tr> <tr> <td>INLET FLOW (kg/s)</td> <td>307</td> <td>110</td> <td>119</td> <td>113</td> </tr> </table> <table border="1"> <tr> <th colspan="2">AIR VELOCITY (m/s)</th> </tr> <tr> <td>0.81</td> <td>3.27</td> <td>5.7</td> </tr> </table> <table border="1"> <tr> <th colspan="2">INLET AIR FLOW (kg/s)</th> <th colspan="2">CHARGE AIR FLOW (kg/s)</th> </tr> <tr> <td>432</td> <td>644</td> <td>644</td> <td>807</td> </tr> <tr> <td>INLET FLOW 1.08 kg/s</td> <td>0.15</td> <td>0.62</td> <td>1.08</td> </tr> </table>	HEAT REJECTION (EFFICIENCY %)	AIR VELOCITY (m/s)			0.81	3.27	5.7	432	55.2	77.5	83.5	CAPR OF AIR FLOW (kg/s)	644	540	580	753	INLET FLOW (kg/s)	307	110	119	113	AIR VELOCITY (m/s)		0.81	3.27	5.7	INLET AIR FLOW (kg/s)		CHARGE AIR FLOW (kg/s)		432	644	644	807	INLET FLOW 1.08 kg/s	0.15	0.62	1.08
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4	CPS 0032, IV G Class B (See exception)	HOT AGE TEST Chamber Temperature 185°C ± 5 °C, instead of 205 °C All Parts will be used for Flow to Blow-off Outlet Plate	Valeo SLP	The CAC shall not develop a crimp or tank leakage that exceed a leak rate of 500 cc/min at 207 kPa after enduring min. time requirement. Minimum life Inlet side: 200 hrs Minimum life Outlet side: 7.5 hrs	PASS 100%	PV	2 CAC	D	17 Aug 12	28 Aug 12	2	D	OK	TR 5373	<table border="1"> <tr> <th>SAMPLE ID</th> <th>200 HOURS (INLET SIDE)</th> <th>75 HOURS (OUTLET SIDE)</th> <th>TOTAL OF HOURS TESTED</th> <th>LEAK RATE AFTER TEST</th> <th>COMMENTS</th> </tr> <tr> <td>LB122152</td> <td>OK</td> <td>OK</td> <td>201</td> <td>0.0</td> <td>NO LEAKS DETECTED</td> </tr> <tr> <td>LB122153</td> <td>OK</td> <td>OK</td> <td>201</td> <td>0.0</td> <td>NO LEAKS DETECTED</td> </tr> </table>	SAMPLE ID	200 HOURS (INLET SIDE)	75 HOURS (OUTLET SIDE)	TOTAL OF HOURS TESTED	LEAK RATE AFTER TEST	COMMENTS	LB122152	OK	OK	201	0.0	NO LEAKS DETECTED	LB122153	OK	OK	201	0.0	NO LEAKS DETECTED																				
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LB122152	OK	OK	201	0.0	NO LEAKS DETECTED																																																
LB122153	OK	OK	201	0.0	NO LEAKS DETECTED																																																
5	Valeo PCD 1703, PCD 1714	Vibration test Tri Axial test Road Load data from DPG or MPG testing	Valeo AH	Minimum hours: Two life cycles (206 hrs.) After completion, the CAC shall have no distortion and no cracks, be fully functional and meet the criteria of the Leak test. This will be applied just to the CAC area. Test to prove the performance of tank and header due to the weight added	PASS 100%	PV	2 CAC	D	17 Aug 12	28 Aug 12	2	D	OK	TR 56066	<table border="1"> <tr> <th>SAMPLE ID</th> <th>TOTAL OF HOURS</th> <th>LEAK RATE AFTER TEST</th> <th>COMMENTS</th> </tr> <tr> <td>63974</td> <td>206</td> <td>0.0</td> <td>TEST PERFORMED WITH FINAL MUFFLER AND INTERNAL PLASTIC COVER</td> </tr> <tr> <td>63977</td> <td>206</td> <td>0.0</td> <td>TEST PERFORMED WITH FINAL MUFFLER AND INTERNAL PLASTIC COVER</td> </tr> </table> <p>NOTE: AFTER REVIEW THE INTERNAL WITH PLASTIC COVER. SST LL ON PLACE AFTER THE TEST</p>	SAMPLE ID	TOTAL OF HOURS	LEAK RATE AFTER TEST	COMMENTS	63974	206	0.0	TEST PERFORMED WITH FINAL MUFFLER AND INTERNAL PLASTIC COVER	63977	206	0.0	TEST PERFORMED WITH FINAL MUFFLER AND INTERNAL PLASTIC COVER																										
SAMPLE ID	TOTAL OF HOURS	LEAK RATE AFTER TEST	COMMENTS																																																		
63974	206	0.0	TEST PERFORMED WITH FINAL MUFFLER AND INTERNAL PLASTIC COVER																																																		
63977	206	0.0	TEST PERFORMED WITH FINAL MUFFLER AND INTERNAL PLASTIC COVER																																																		

PE13-018 031306



PRODUCT VALIDATION PLAN & REPORT
 CONFIDENTIAL
OBJECTIVE: PRODUCT VALIDATION NEW CAC P415 eCBV, 57MA proposal (Plastic tanks)

PLM control:	PVPR No:	PV12 134	REVISION No:	9
ECOM:	ORIGIN DATE:	27 May 11	DATE REV:	27 Aug 12
PCR #:	N/A		APPROVAL:	
PRR #:	N/A		R&D Manager / R. Sanchez	
			Qual by Site Manager / K. Holtek	

MODEL YEARS:	COMPONENT / ASSY:	VALEO PIN	DRAWING & REV	SUPPL. SR NAME:	CUSTOMER APPROVAL:			
2013	Charger Cooler (CAC)	M165170	100046940 REV A	Valeo Termico	NAME	SIGN	DATE	
PROJECT APPL. CATION (S)	CUSTOMER:	CUSTOMER PIN	ASSEMBLY PLANT:	ORIGINATOR:	PT Pin Coordinator / E. Barba			
FORD F Series GTDI	FORD		VEC SLP	GUILLERMO GUADRARRAMA	Project Manager or Change Leader			
					Testing Lab / J. A. B. de Honor U			
					Other: /			

6	No Spec associated	<p>Pull Off Force (Cover will be pulled from header after crimping) Record as: Newton force required to pull cover from the crimp (line from tube) Rate 5 +/- 1 mm/min Test part as crimped (6) Test after Pre heat (6)</p> <p>Pre heating Chamber Temperature: 185C ± 5 OC. Will be performed just on cores</p>	<p>Pre Heating NO LEAK TEST REQUIRED The core must meet the requirement of minimum of 200 hrs New test so no or less published at this time RECORD</p>	Valeo SLP		PASS 100%	PV	12 COR E	D	17 Aug 12	29 Aug 12	12	D	OK	TR 9624	<p>CRIMP IN 8 LOCATIONS SEE PICTURE FOR MORE DETAIL</p> <p>BEFORE HOT AGE TEST:</p> <table border="1"> <tr><th>SAMPLE ID</th><th>MAXIMUM FORCE (N)</th></tr> <tr><td>SAM 1</td><td>1000</td></tr> <tr><td>SAM 2</td><td>726</td></tr> <tr><td>SAM 3</td><td>1003</td></tr> <tr><td>SAM 4</td><td>880</td></tr> <tr><td>SAM 5</td><td>734</td></tr> <tr><td>SAM 6</td><td>1314</td></tr> </table> <p>AFTER HOT AGE TEST:</p> <table border="1"> <tr><th>SAMPLE ID</th><th>MAXIMUM FORCE (N)</th></tr> <tr><td>LB122154</td><td>1091</td></tr> <tr><td>LB122155</td><td>2311</td></tr> <tr><td>LB122156</td><td>1830</td></tr> <tr><td>LB122157</td><td>2253</td></tr> <tr><td>LB122158</td><td>1338</td></tr> <tr><td>LB122159</td><td>2041</td></tr> </table>	SAMPLE ID	MAXIMUM FORCE (N)	SAM 1	1000	SAM 2	726	SAM 3	1003	SAM 4	880	SAM 5	734	SAM 6	1314	SAMPLE ID	MAXIMUM FORCE (N)	LB122154	1091	LB122155	2311	LB122156	1830	LB122157	2253	LB122158	1338	LB122159	2041
SAMPLE ID	MAXIMUM FORCE (N)																																											
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LB122155	2311																																											
LB122156	1830																																											
LB122157	2253																																											
LB122158	1338																																											
LB122159	2041																																											
7	No Spec associated	<p>Flow to Blow off Outlet Plate After hot age test completion With no plastic cover and only outlet cover (fully assembled CAC) apply during 10 min. The max flow the CAC could see in the vehicle (1560 kg/h) Test will be made on Heat Transfer bench at the same conditions as Heat Transfer test except for the flow.</p>	<p>Cover must still be attached to the tubes</p>	Valeo SLP		PASS 100%	PV	2 CAC	D	28 Aug 12	28 Aug 12	2	D	OK	TR 5370	<p>AFTER HOT AGE TEST:</p> <table border="1"> <tr><th>SAMPLE ID</th><th>FLOW = 1560 kg/h @ 17s</th><th>PASS</th></tr> <tr><td>LB122152</td><td></td><td>PASS</td></tr> <tr><td>LB122153</td><td></td><td>PASS</td></tr> </table> <p>9th SIDE:</p> <p>1th SIDE:</p> <p>COMMENTS: AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT AFTER FLOW APPLIED NO PLASTIC COVER DETACHMENT</p>	SAMPLE ID	FLOW = 1560 kg/h @ 17s	PASS	LB122152		PASS	LB122153		PASS																			
SAMPLE ID	FLOW = 1560 kg/h @ 17s	PASS																																										
LB122152		PASS																																										
LB122153		PASS																																										

PROCEDURE	TEST DESCRIPTION	ACCEPTANCE CRITERIA	TARGET REQ.	TEST STAGE	SAMPLES TESTED	SAMPLE TYPE	ACTUAL RESULTS
SPECIFY THE GOVERNING TEST PROCEDURE OR STANDARD	PREPARE A DESCRIPTION OF EACH TEST	SPECIFY CYCLES MINIMUM VALUES NO FAILURES ETC	STAGE TO DO REL. ABILITY OR NO FAILURE	ENGINEERING DESIGN DV = DESIGN VALIDATION PV = PRODUCTION VALIDATION CD = CONTINUOUS CONFORMANCE	LIST QUANTITY TESTED SAMPLES TYPE ETC	A= PROTOTYPE (HAND MADE) B= PROTOTYPE (TOOL ED) C= PROGRAM LEVEL D= INITIAL PRODUCTION	LIST RESULT IN TERMS OF EG: R=0 C=0 PASS OR NO FAILURE NBR OF CYCLES WITH OR WITHOUT FAILURE

Rev	Date	Change description / NOTES
1	27 May 11	PVPR released for customer approval
2	04 Oct 11	1) Rel Age added per customer request 2) Comments added
3	14 May 12	1) Intermittent PV added 2) Comments added
4	12 Jun 12	1) Complete PV12 090 with data
5	30 Jul 12	1) Complete PV11 081 with data 2) WP15 addition
6	13 Ago 12	1) Addition of PV12 122: Sealing process on a laminate cover for CAC P415 and New Crimping press validation due to volume increase 2) Addition of PV12 134: 27mm release Cover? also added to related Outlet Header. New Lowest Tolerations: greatest change
7	15 Ago 12	1) Addition of Flow to Blow off Outlet plate
8	23 Ago 12	1) Duffin testing
9	27 Ago 12	1) Complete with data

PE13-018 031307

From: John SAVAGE [john.savage@valeo.com]
Sent: Thursday, March 29, 2012 8:05 AM
To: Tyler, Jim (J.S.)
Cc: Kramer, Michael (M.T.); Joseph LUMETTA; Larry ENGEL
Subject: Re: Updated: P415 CAC internal dP Test Results with tube blockage
Attachments: CAC Charce Air Side Dp Data.ppt

See attached

JRS

On Thu, Mar 29, 2012 at 10:57 AM, Tyler, Jim (J.S.) <jtyler1@ford.com> wrote:
Please forward to John Savage. Will start meeting about 11:05.

Review internal dP Valeo test results with:

- 1) Baseline CAC with int louver fins
- 2) Ratholes blocked, both ends
- 3) Ratholes blocked, block 2 + 2 end tubes
- 4) Ratholes blocked, block 4 + 4 end tubes
- 5) Ratholes blocked, plus 4mm additional tube blocked per side full length

Jim Tyler invites you to an online meeting using WebEx.

=====
Online Meeting Summary
=====

Meeting Link: <https://ford.webex.com/ford/j.php?J=719916190>
WebEx Meeting ID: 719 916 190
Meeting Password: This meeting does not require a password.
Audio: 313-621-3673 (ID 71351008)

=====
Complete Meeting Details
=====

Teleconference Information:

313-621-3673 (ID 71351008)

Dialing Instructions:

Ford Net: x13673
Non FordNet Access:
Toll (International): +1.313.621.3673
Toll-free: 1.888.621.3673
U.K.: +44.1277.25.2555
Germany: +49.221.90.22555
Sweden: +46.31.3253673
Belgium: +32.89.619700

Meeting Number: 719 916 190

Meeting Password: This meeting does not require a password.

To join this meeting (Now from mobile devices!)

-
1. Go to <https://ford.webex.com/ford/j.php?J=719916190>
 2. If requested, enter your name and email address.
 3. If a password is required, enter the meeting password: This meeting does not require a password.
 4. Click "Join".
 5. Follow the instructions that appear on your screen.

<http://www.webex.com>

MC06

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P415 CAC Charge Air Side Pressure Drop Measurements

John R. Savage
Valeo Sr. Expert Fan Systems

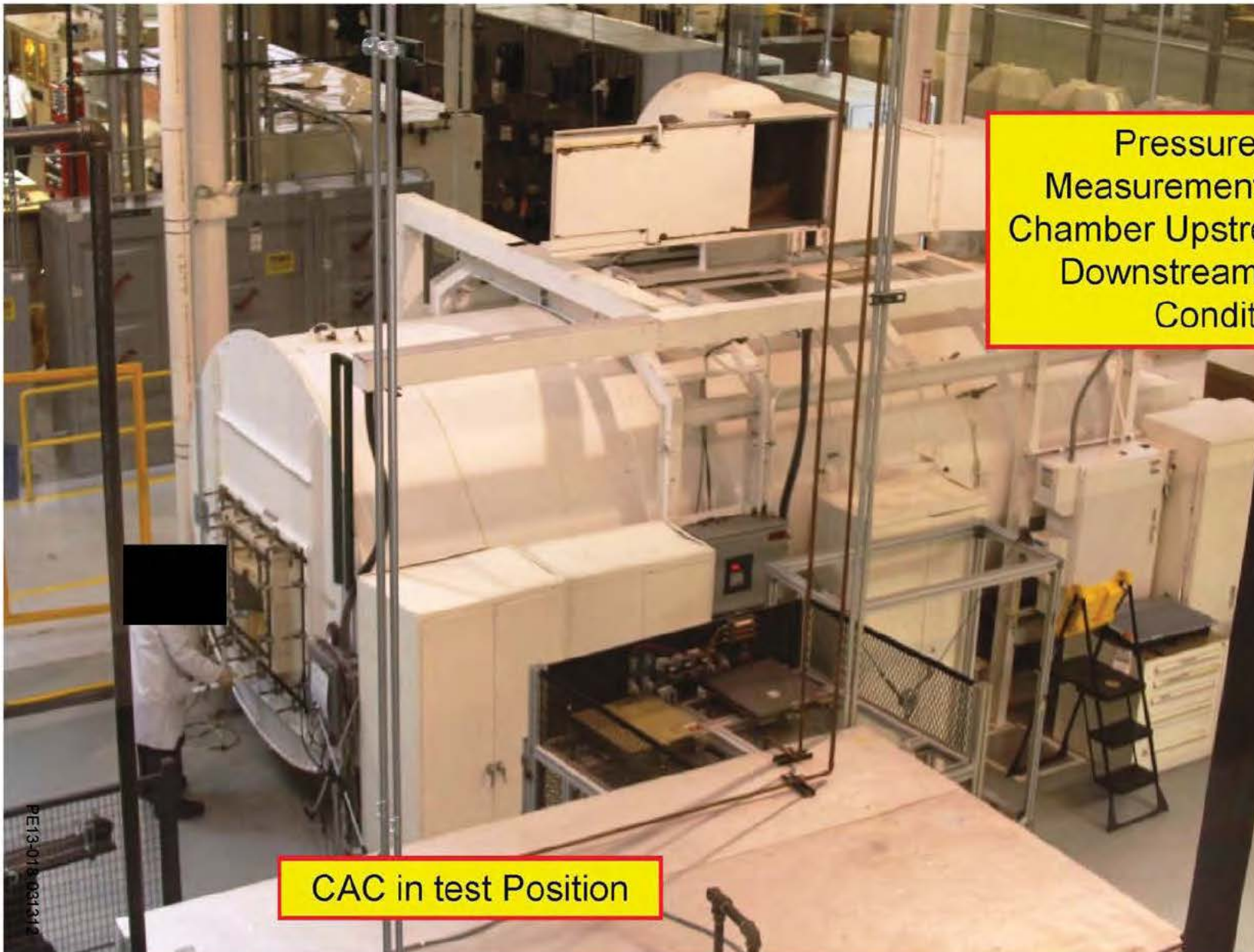
PE13-018 031310

March 29, 2012

Objectives

- **Determine feasibility of using fan airflow test facility to measure flow vs pressure drop behavior for Charge Air Side of P415 Charge Air Cooler**
- **Intent is not to compare pressure drop against drawing spec test condition, but to evaluate differences in pressure drop between different internal tube blocking schemes**

Airflow Facility



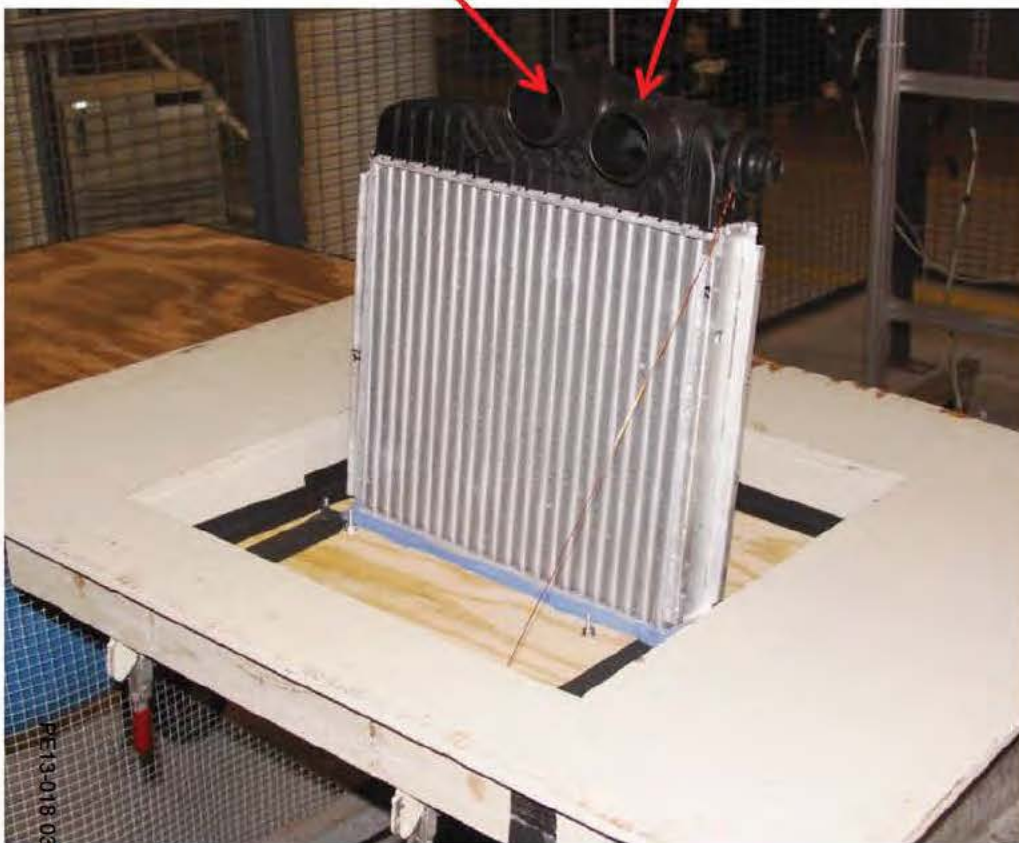
Pressure Drop
Measurement: Plenum
Chamber Upstream Total vs
Downstream Ambient
Condition

CAC in test Position

PE13-018-081319

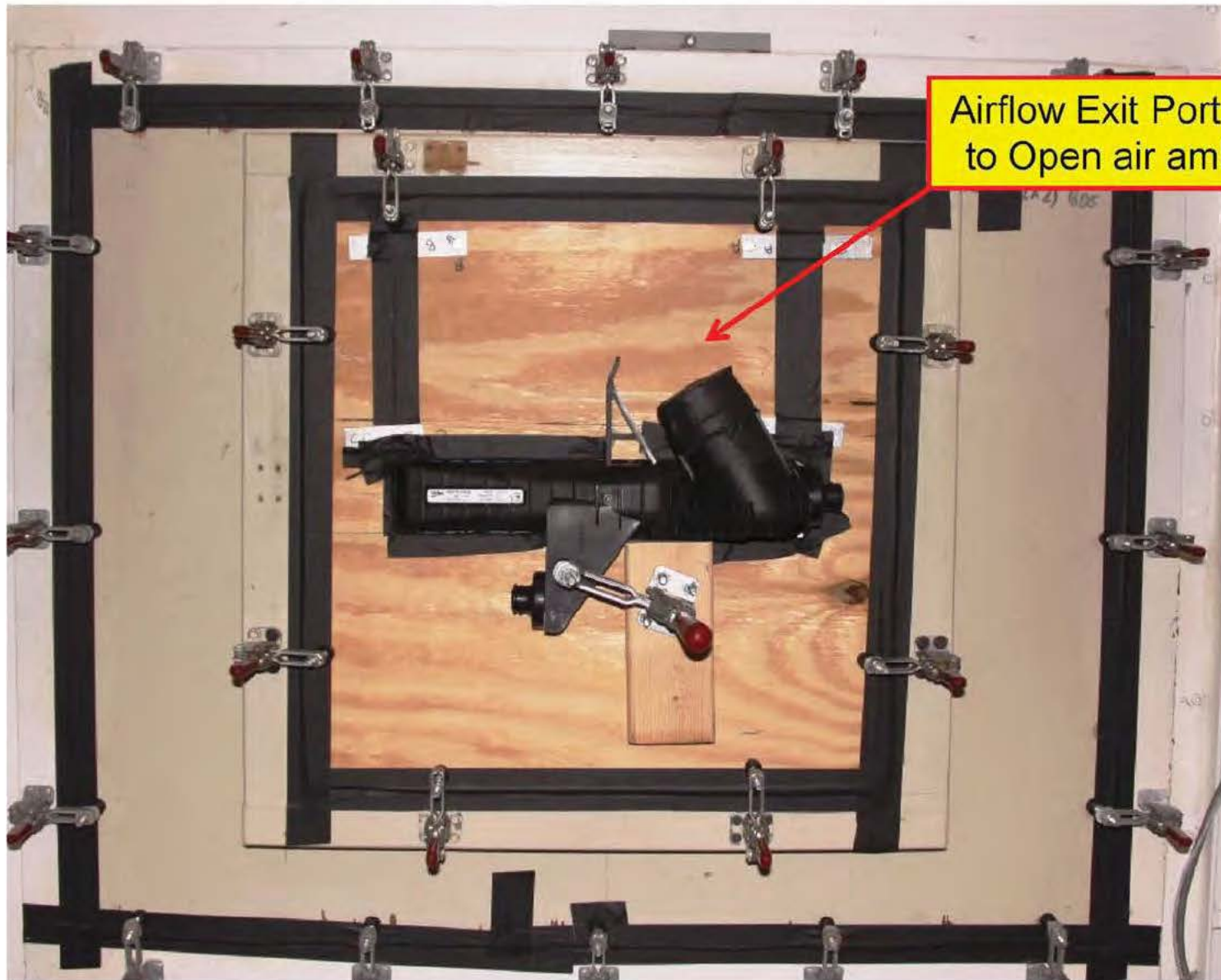
Installation of CAC on Airflow Chamber: Plenum Chamber Inlet Side

Airflow Inlet Ports
open to plenum
chamber



PE13-018 081313

Installation of CAC on Airflow Chamber: Downstream Exit (Ambient Air) Side



PE13-018 031314

Test Procedure

- **Install CAC on board with appropriate sealing and conduct flow vs pressure testing**
- **Determine working range of airflow test facility**
 - 2" diameter nozzle used for airflow measurements
 - Plenum chamber differential pressure transducer limited to 10 mm Hg range (1.3332 Kpa)
 - Working airflow limited to 4 CMM range or 0.08 Kg/Sec
- **Repeat measurements 3 times for working flow & pressure range**
- **Determine leak rate for test set-up with exit port blocked off**
 - Leak flow detected by nozzles for given chamber pressure
 - This leak flow is subtracted from the total flow at the same chamber pressure to identify flow through the CAC
- **Determine repeatability of measurements and compare against working points of CAC**

PE13-018 031315

CAC Working Points

■ CAC Charge Air spec point for lowest flow rate is:

- 0.12 Kg/Sec with inlet conditions of 2 Bar Absolute and 125°C Inlet temperature
- This has density of 1.7505 Kg/M³
- Exit port has ID of 75 mm
- Flow velocity at exit port for this working point at 2 Bar and 125°C conditions is 15.5 M/Sec

■ Test Density for Fan Flow Facility test

- Test density if 1.1406 Kg/M³

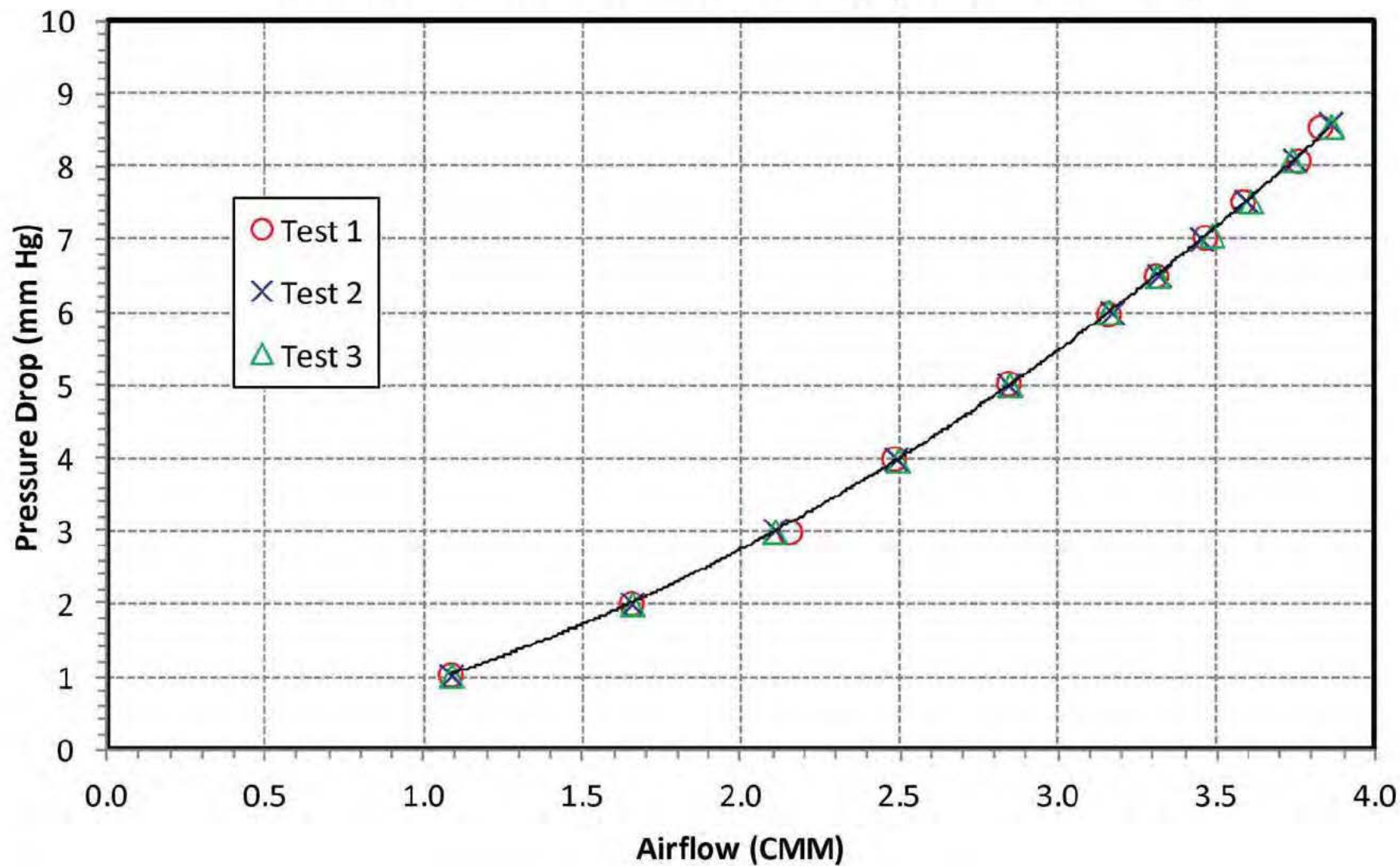
■ Point of comparison is that of Flow velocity at the Exit port area for the measured volumetric airflow rate

Comments on Pressure Rise Measurement

- Fan wind tunnels are set to measure a Static pressure differential where the velocity component of the exit air is not considered
- Heat exchanger core pressure drops are usually a Total pressure drop
- Upstream total vs exit condition ambient (barometric) static pressure difference can be converted to a Total pressure drop by accounting for the dynamic pressure based on area averaged velocity at the open CAC exit port

Raw Test Results

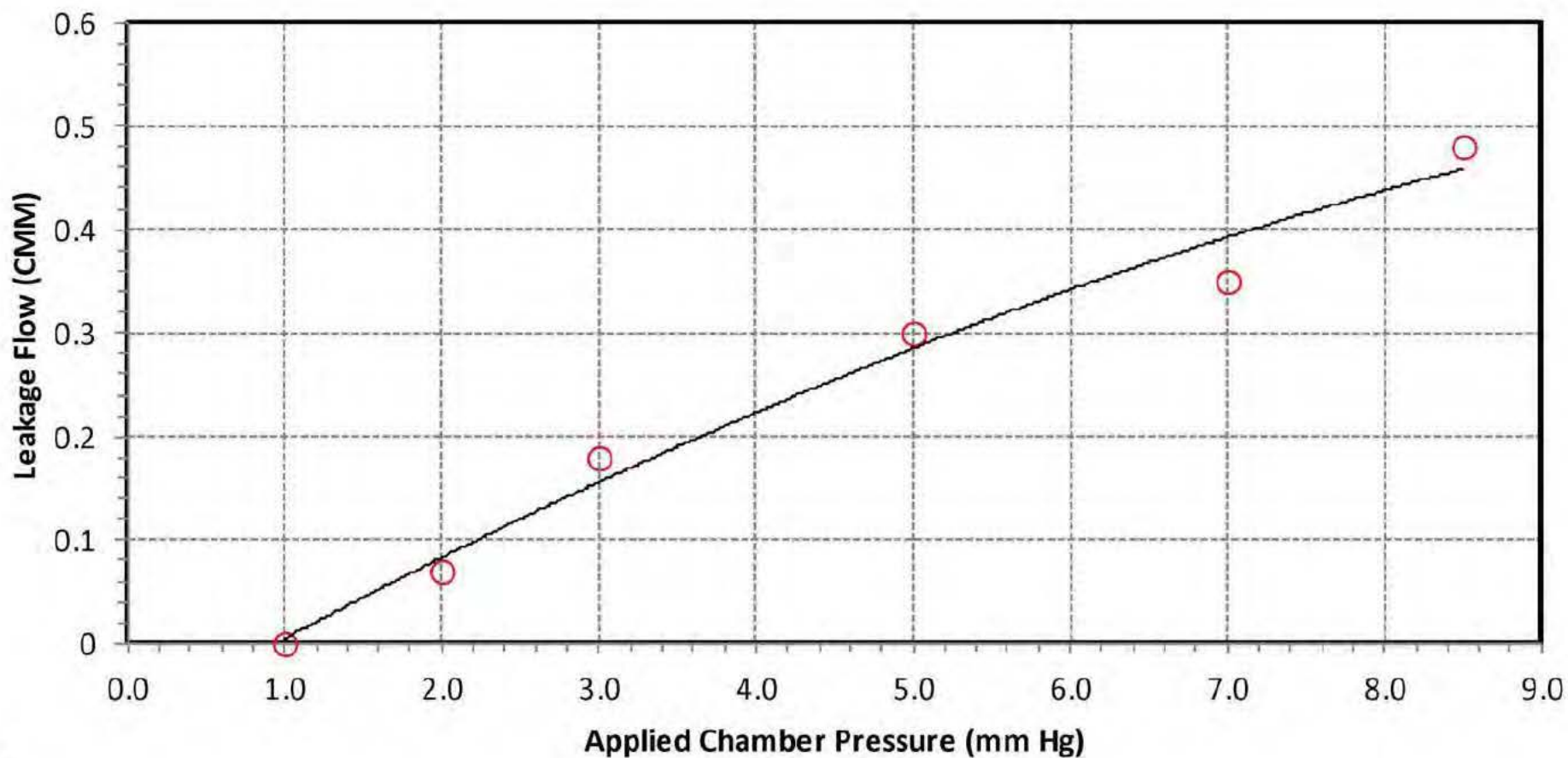
P415 CAC Internal Flow vs Dp (Raw Test Data)



PE13-018 031318

Leak Test Results

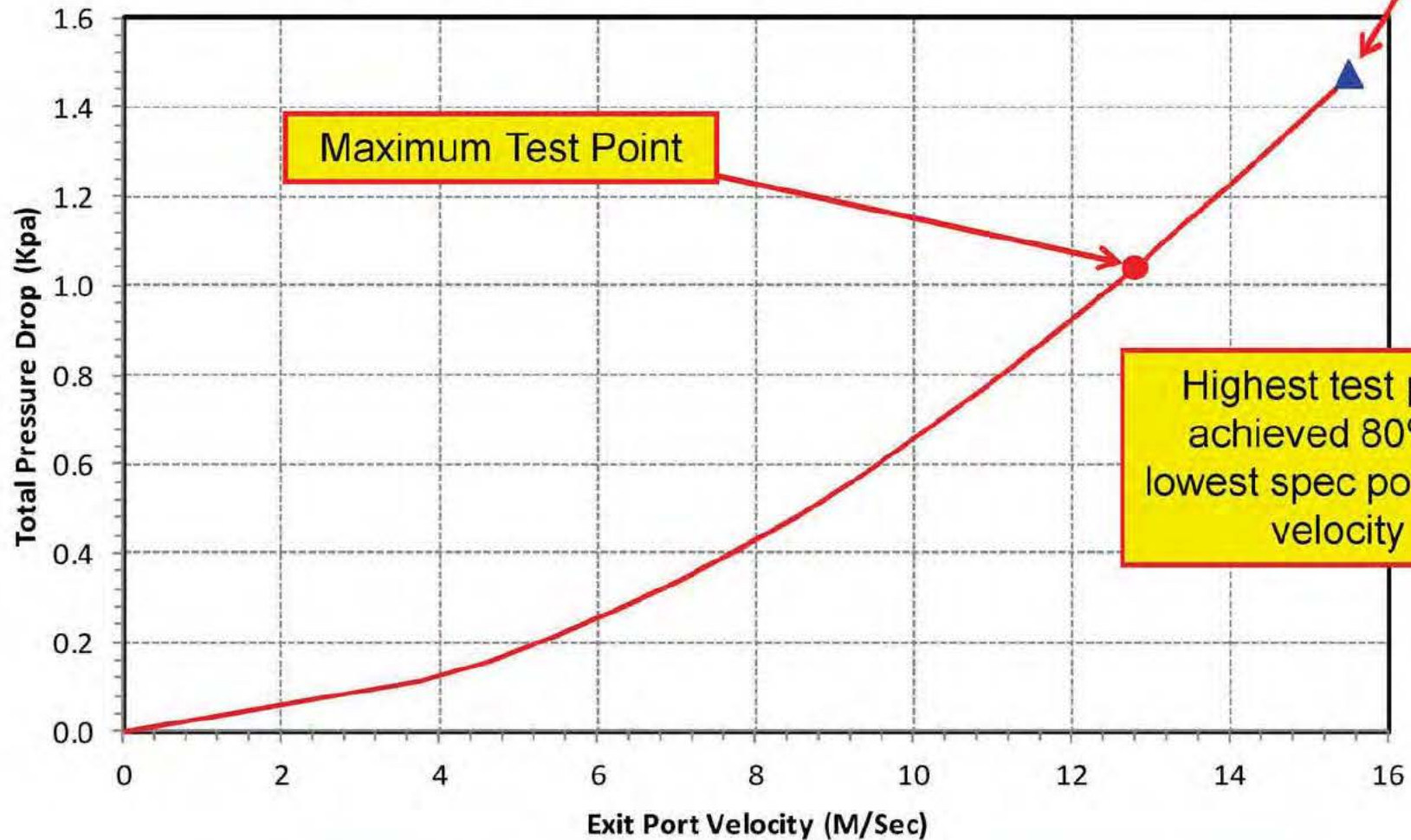
P415 CAC Internal Flow : Blocked Off Leak Test



PE13-018 031319

Flow Velocity vs Total Pressure Drop

P415 CAC Internal Flow vs Dp
For 1.1405 Kg/M3 Air Density Iso-Thermal



Should be high enough flow velocity to capture differences in port blocking schemes

Sensitivity of Result

- **Maximum percent error of Pressure drop from average curve in the higher end of the data range was 1.8%**
- **Differences between trend lines of above 2.5 to 3% should be significant considering the measurement system**
- **Comments:**
 - Assume we repeated test entirely blocking 1 tube
 - Blocking 1 tube of a 21 Tube core is a change of 4.7% flow area
 - Flow velocity should increase by same percentage
 - 4.7% increase in tube velocity should result in a 8.5% Increase in Pressure drop assuming 1.67 exponent for Power curvefit
 - Test method should be able to capture changes in CAC side Dp in the range of what we are considering

Bottom Line:

- I think we can use this test set-up to identify differences in different tube blocking configurations that will be above 2.5 to 3%

From: Kramer, Michael (M.T.)
Sent: Friday, March 29, 2013 9:55 AM
To: Widmann, Carl (C.A.); Weber, Erik (E.M.)
Cc: Andersen, Erik (E.); Huang, Larry (L.); Kramer, Michael (M.T.)
Subject: REFERENCE MY 3/20/13 NOTE. FW: P415 CAC Data
Attachments: CAC P415 WITH EXTERNAL COVERS.pptx

Here are the data sheets for the P415 CAC condensation robustness actions. Please let us know if any questions.

Mike Kramer
Truck Applications PT Cooling Supv.
(313) 805-0190
Sent with Good (www.good.com)

-----Original Message-----

From: Satish NADELLA [satish.nadella@valeo.com]
Sent: Wednesday, March 27, 2013 05:16 PM Eastern Standard Time
To: Andersen, Erik (E.)
Cc: Kramer, Michael (M.T.); Alcaraz andrade, Alejandro (M.); Huang, Larry (L.); Guillermo GUADARRAMA; Eduardo BARRIOS; Blas-Fernando GUTIERREZ
Subject: P415 CAC Data

Hi Erik,

Please find enclosed the data for all of the configurations specified by Mike. Data is from performance testing of these configurations.

Regards,
Satish Nadella

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SPEC CAC P415 2013 WITHOUT INTERNAL COVERS

HEAT REJECTION (EFFICENCY %)		AIR VELOCITY (m/s)		
		0.81	3.27	5.7
CAHRGE AIR FLOW (kg/hr)	432	76.2	89.3	92.5
	684	63.4	82.8	88.9
	1037	50.6	74.0	81.4

ΔP External Air (Pa)	AIR VELOCITY (m/s)		
	0.81	3.27	5.7
INT. FLOW 0.288 kg/s	63.5	266.9	607.5

ΔP Internal Air (mbar)	CAHRGE AIR FLOW (kg/hr)		
	432	684	1037
EXT. FLOW 1.08 kg/s	12.32	26.97	58.14

TEST CONDITIONS

9 point tests

CA Booster P = 2.0 BarA = 200 kPa-A

CA Inlet Temp = 125±1.1°C

Ambient temp. = 25°C

Face vel:

0.154 kg/s

0.62 kg/s

1.08 kg/s

CA flow: □

0.12 kg/s

0.19 kg/s

0.288 kg/s

ONE (7 TUBE & 8 FIN) EXTERNAL BLOQUER WITHOUT INTERNAL COVERS

HEAT REJECTION (EFFICENCY %)		AIR VELOCITY Kg/s (m/s)		
		0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
CAHRGE AIR FLOW Kg/s (kg/hr)	0.12 (432)	43.5	50.5	53.6
	0.19 (684)	36.4	45.1	48.4
	0.28 (1037)	29.2	39.2	43.2

ΔP External AIR (Pa)	AIR VELOCITY Kg/s (m/s)		
	0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
INT. FLOW 0.288 kg/s	71.1	276.1	626.6

ΔP Internal Air (mbar)	CAHRGE AIR FLOW Kg/s (kg/hr)		
	0.12 (432)	0.19 (684)	0.28 (1037)
EXT. FLOW 1.08 kg/s	8.55	18.54	40.51

TEST CONDITIONS

9 point tests

CA Booster P = 2.0 BarA = 200 kPa-A

CA Inlet Temp = 125±1.1°C

Ambient temp. = 25°C

Face vel:

0.154 kg/s

0.62 kg/s

1.08 kg/s

CA flow: □

0.12 kg/s

0.19 kg/s

0.288 kg/s

TWO (7 TUBE & 8 FIN) EXTERNAL BLOQUER WITHOUT INTERNAL COVERS

HEAT REJECTION (EFFICIENCY %)		AIR VELOCITY Kg/s (m/s)		
		0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
CAHRGE AIR FLOW Kg/s (kg/hr)	0.12 (432)	44.0	51.5	55.0
	0.19 (684)	36.5	45.6	49.0
	0.28 (1037)	29.4	39.6	43.7

ΔP External AIR (Pa)	AIR VELOCITY Kg/s (m/s)		
	0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
INT. FLOW 0.288 kg/s	71.4	276.9	630.9

ΔP Internal Air (mbar)	CAHRGE AIR FLOW Kg/s (kg/hr)		
	0.12 (432)	0.19 (684)	0.28 (1037)
EXT. FLOW 1.08 kg/s	8.38	18.67	40.54

TEST CONDITIONS

9 point tests

CA Booster P = 2.0 BarA = 200 kPa-A

CA Inlet Temp = 125±1.1°C

Ambient temp. = 25°C

Face vel:

0.154 kg/s

0.62 kg/s

1.08 kg/s

CA flow: □

0.12 kg/s

0.19 kg/s

0.288 kg/s

SPEC CAC P415 2013 WITH INTERNAL COVERS

HEAT REJECTION EFFICIENCY %		AIR VELOCITY (m/s)		
		0.81	3.27	5.7
CHARGE AIR FLOW (Kg/hr)	432	65.2	77.5	82.6
	684	54.6	69.8	75.9
	1037	43.8	61.9	67.8

ΔP External AIR (Pa)	AIR VELOCITY (m/s)		
	0.81	3.27	5.7
INT. FLOW 0.288 kg/s	618	264.0	607.1

ΔP Internal AIR (mbar)	CHARGE AIR FLOW (Kg/hr)		
	432	684	1037
EXT. FLOW 1.08 Kg/s	14.24	32.33	71.39

TEST CONDITIONS

9 point tests

CA Booster P = 2.0 BarA = 200 kPa-A

CA Inlet Temp = 125±1.1°C

Ambient temp. = 25°C

Face vel:

0.154 kg/s

0.62 kg/s

1.08 kg/s

CA flow: □

0.12 kg/s

0.19 kg/s

0.288 kg/s

ONE (7 TUBE & 8 FIN) EXTERNAL BLOQUER WITH INTERNAL COVERS

HEAT REJECTION (EFFICIENCY %)		AIR VELOCITY Kg/s (m/s)		
		0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
CAHRGE AIR FLOW Kg/s (kg/hr)	0.12 (432)	46.8	55.8	59.7
	0.19 (684)	38.4	48.7	53.6
	0.28 (1037)	30.6	42.0	46.7

ΔP External AIR (Pa)	AIR VELOCITY Kg/s (m/s)		
	0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
INT. FLOW 0.288 kg/s	69.6	274.3	629.0

ΔP Internal Air (mbar)	CAHRGE AIR FLOW Kg/s (kg/hr)		
	0.12 (432)	0.19 (684)	0.28 (1037)
EXT. FLOW 1.08 kg/s	14.34	32.38	69.55

TEST CONDITIONS

9 point tests

CA Booster P = 2.0 BarA = 200 kPa-A

CA Inlet Temp = 125±1.1°C

Ambient temp. = 25°C

Face vel:

0.154 kg/s

0.62 kg/s

1.08 kg/s

CA flow: □

0.12 kg/s

0.19 kg/s

0.288 kg/s

TWO (7 TUBE & 8 FIN) EXTERNAL BLOQUER WITH INTERNAL COVERS

HEAT REJECTION (EFFICIENCY %)		AIR VELOCITY Kg/s (m/s)		
		0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
CAHRGE AIR FLOW Kg/s (kg/hr)	0.12 (432)	46.4	55.8	59.6
	0.19 (684)	38.1	49.4	53.4
	0.28 (1037)	30.2	41.9	46.5

ΔP External AIR (Pa)	AIR VELOCITY Kg/s (m/s)		
	0.154 (0.81)	0.62 (3.27)	1.08 (5.7)
INT. FLOW 0.288 kg/s	70.3	274.5	623.3

ΔP Internal Air (mbar)	CAHRGE AIR FLOW Kg/s (kg/hr)		
	0.12 (432)	0.19 (684)	0.28 (1037)
EXT. FLOW 1.08 kg/s	14.17	32.34	68.95

TEST CONDITIONS

9 point tests

CA Booster P = 2.0 BarA = 200 kPa-A

CA Inlet Temp = 125±1.1°C

Ambient temp. = 25°C

Face vel:

0.154 kg/s

0.62 kg/s

1.08 kg/s

CA flow: □

0.12 kg/s

0.19 kg/s

0.288 kg/s

Subject: Updated: P415 CAC Design Change Options, Timing, and Cost

Location: Audio + Webex, Audio Dial 313-621-3673, Meeting ID: 85694781#

Start: 2/21/2012 2:30 PM

End: 2/21/2012 3:30 PM

Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Required Attendees: Satish NADELLA; Joseph LUMETTA; Andersen, Erik (E.); Tyler, Jim (J.S.); Meyer, Robert (R.H.); Blas-Fernando GUTIERREZ

Optional Attendees: Kramer, Michael (M.T.); Ladd, John (J.R.)

Resources: Audio + Webex, Audio Dial 313-621-3673, Meeting ID: 85694781#

WebExOI:

WebExOIHost:

WebExOIVer: 330

When: Tuesday, February 21, 2012 2:30 PM-3:30 PM (GMT-05:00) Eastern Time (US & Canada).

Where: Audio + Webex, Audio Dial 313-621-3673, Meeting ID: 85694781#

Note: The GMT offset above does not reflect daylight saving time adjustments.

~~*~*~*~*~*~*~*~*

Updated proposals, 2/21/2012.

To Discuss:

- 1) Water-drain port design
- 2) Water perforation design

Webex Link:

You have successfully scheduled the following meeting:

=====

Online Meeting Summary

=====

TOPIC: Webex Link

Meeting Link: <https://ford.webex.com/ford/j.php?ED=171201402&UID=483694722&RT=MiMxMQ%3D%3D>
DATE: Tuesday, February 21, 2012
TIME: 2:30 pm, Eastern Standard Time (New York, GMT-05:00)
MEETING NUMBER: 713 451 064
PASSWORD: (This meeting does not require a password.)

P415 CAC Design Revision, Option I

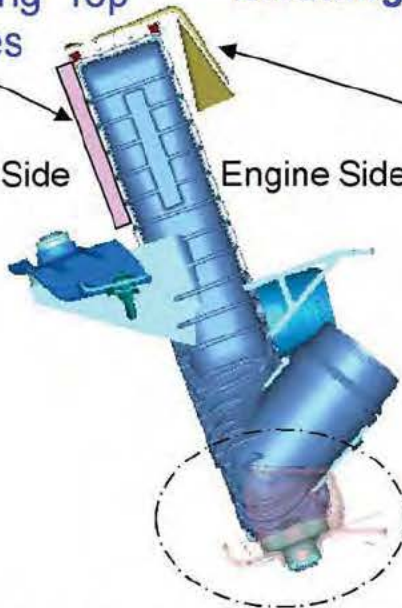
Blocking upper 6 tubes and Adding Vacuum-Drained Port

Covering Top
6 Tubes

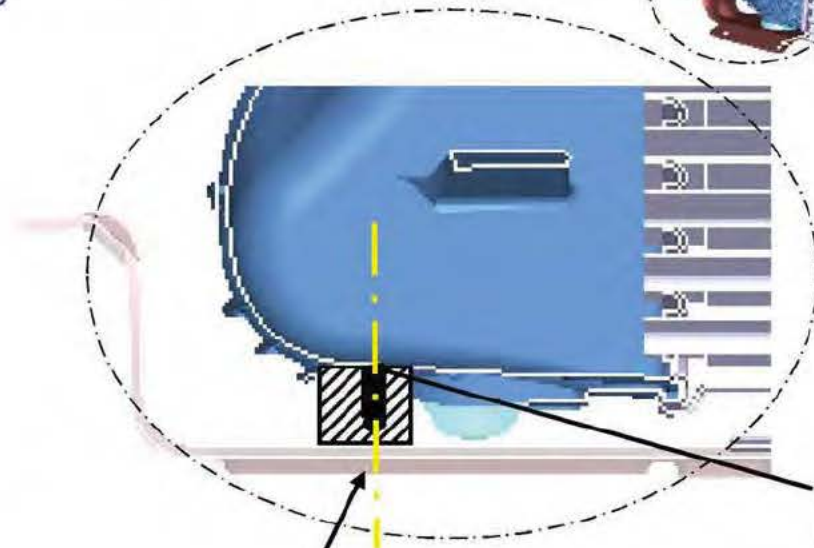
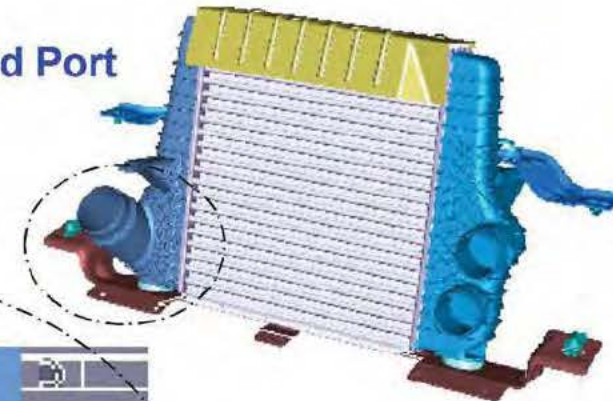
Drill Side

Engine Side

Existing Upper Shield
to be modified for
Blocking 6 tubes from
grill side

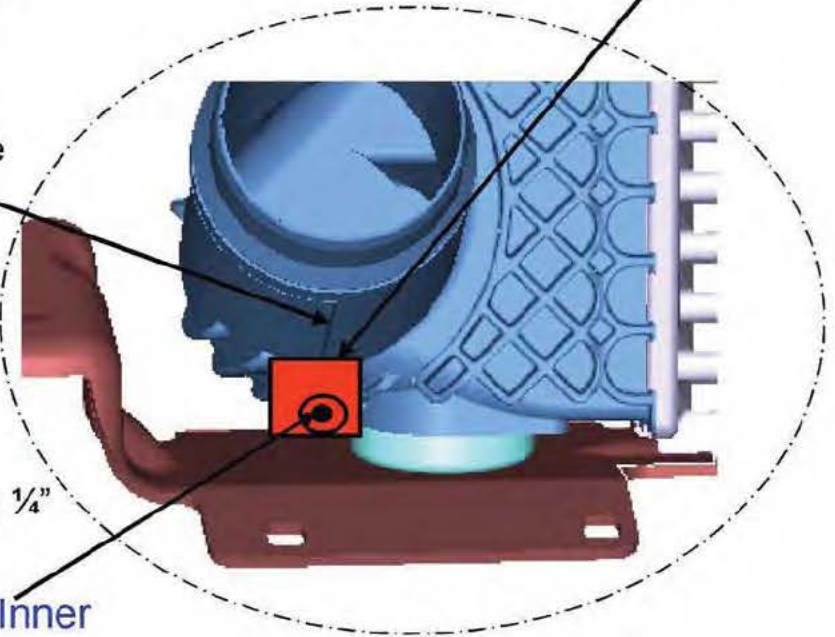


Side View -- On-Vehicle Orientation



2mm hole,
flushed with tank

Tank mold
Parting Line

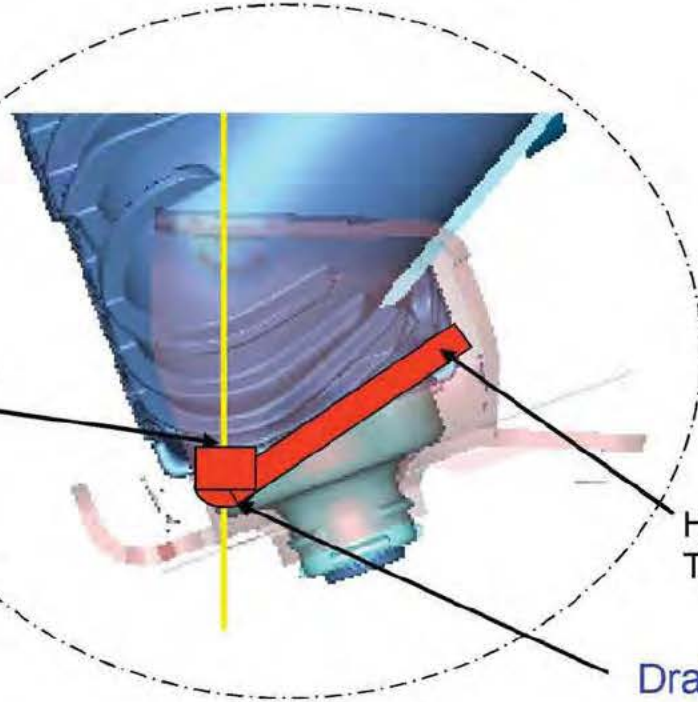


Hose Port,
TBD hose size, 1/4"

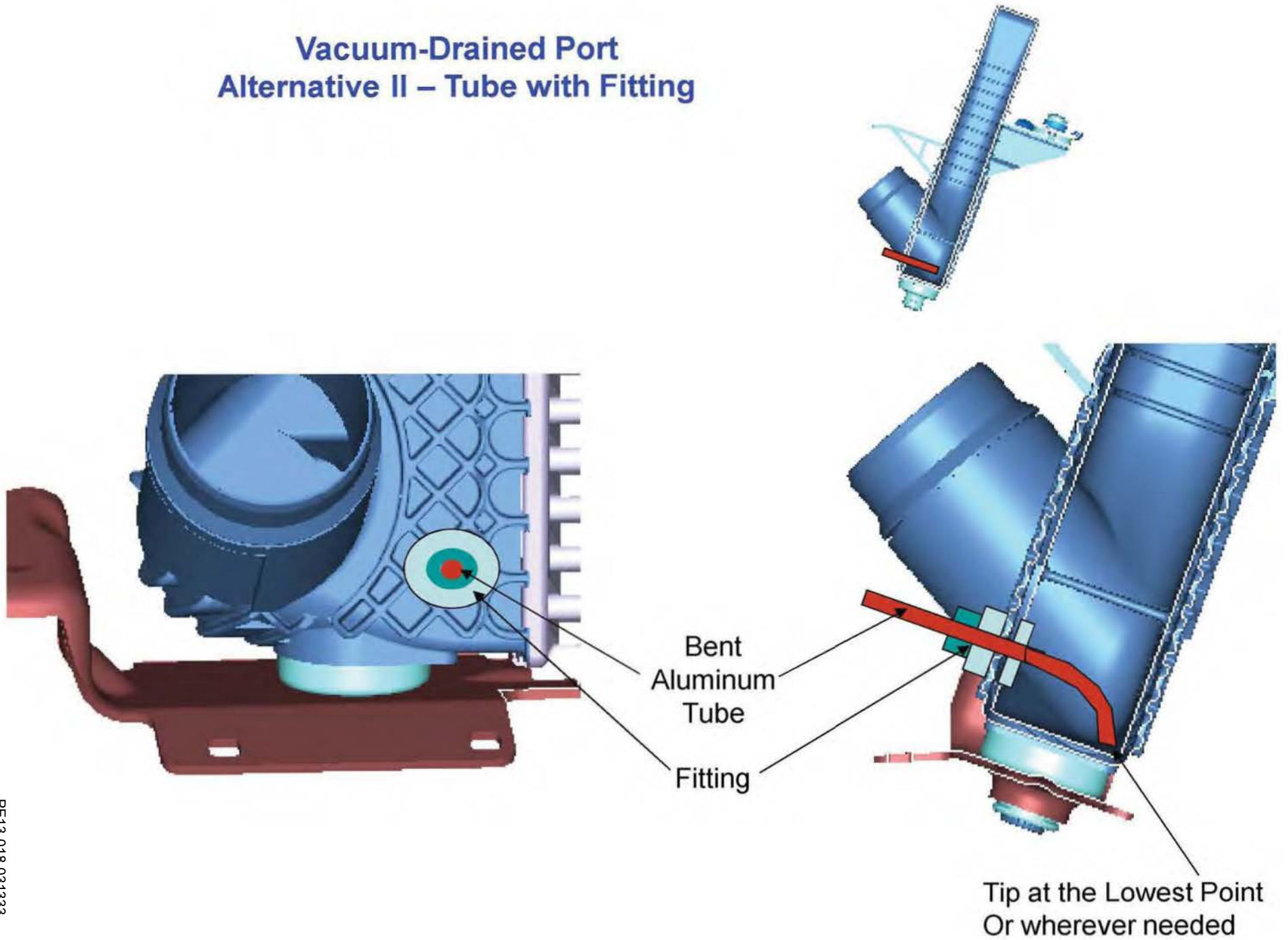
Drain Port with Inner
Hole ID 2mm

Lowest point in
X-direction

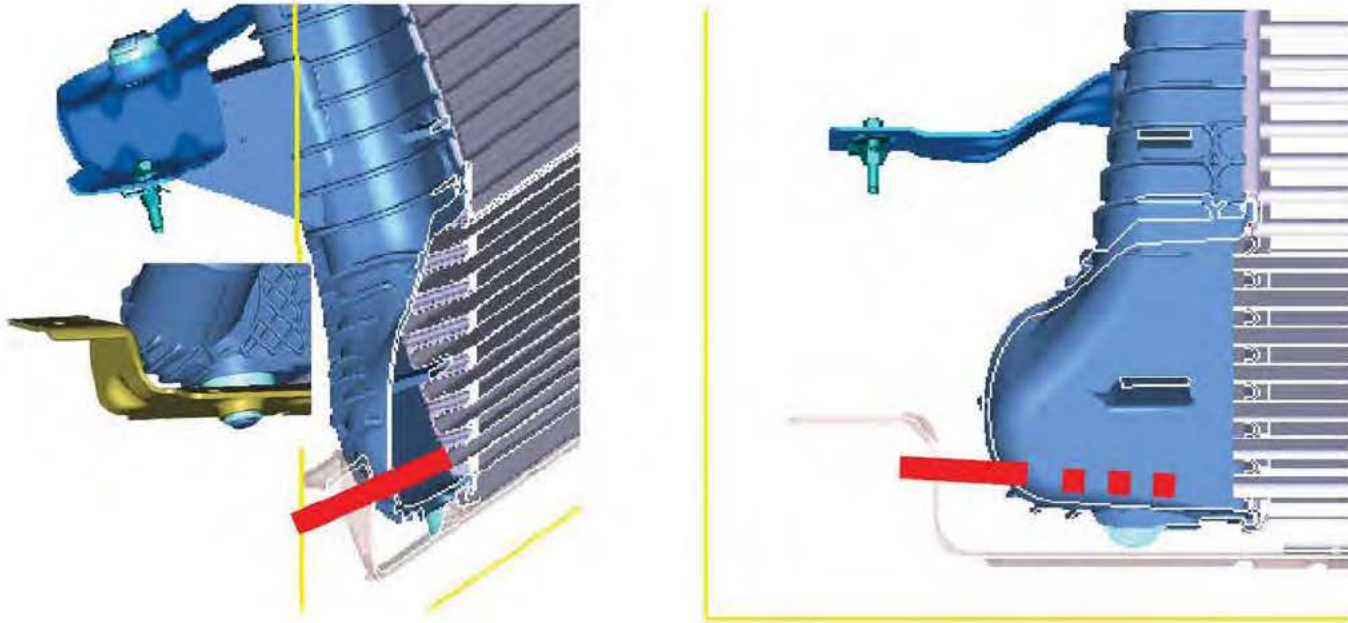
PE13-018 031332



Vacuum-Drained Port Alternative II – Tube with Fitting

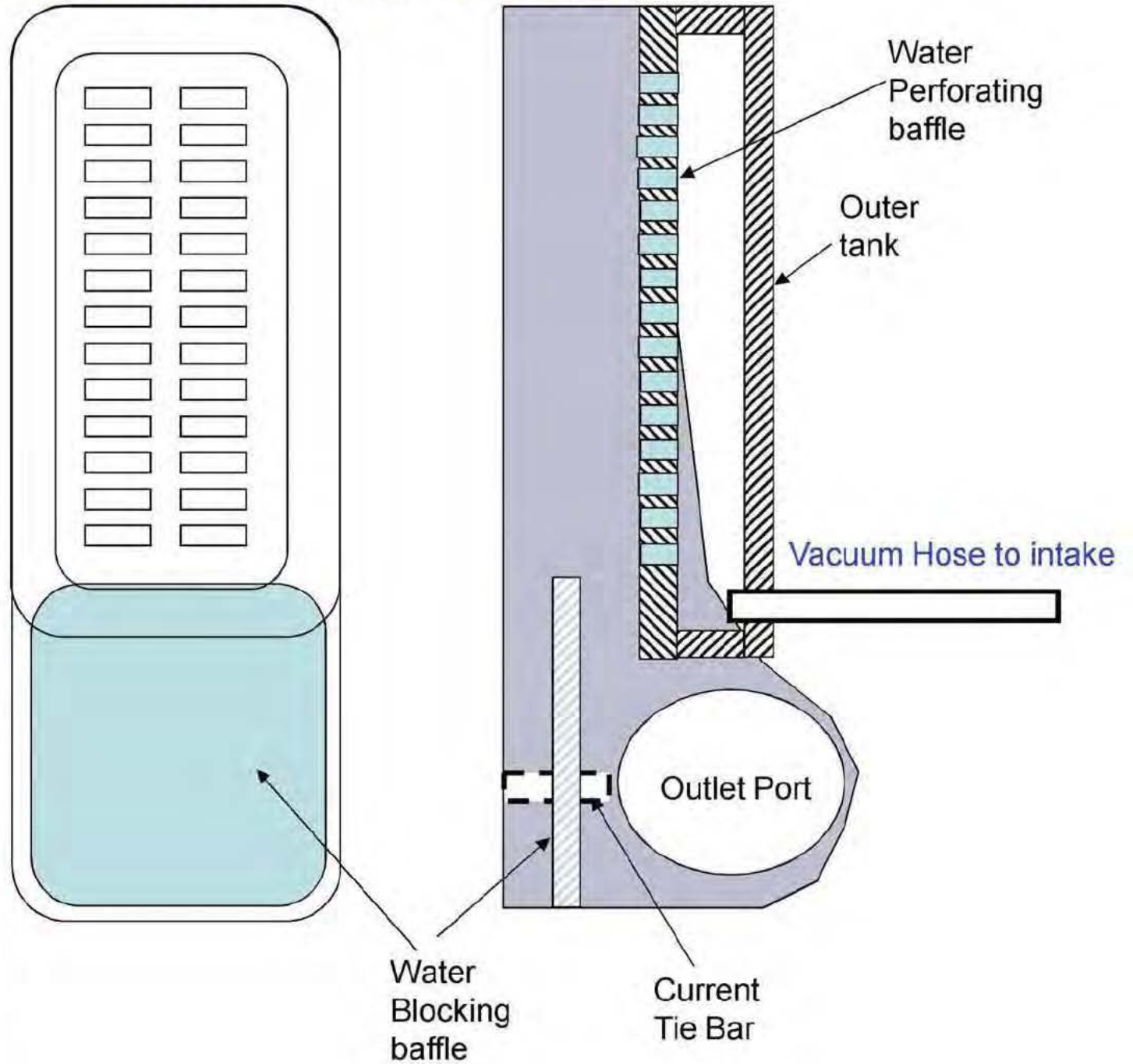


Vacuum-Drained Port Alternative III – Transverse Drain Port



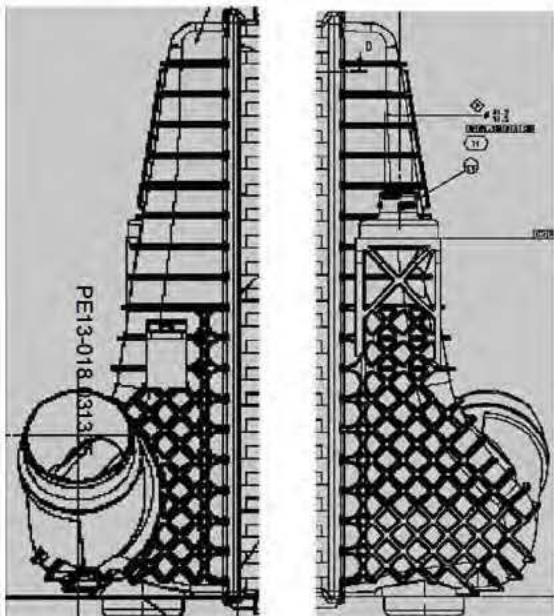
Transverse Drain Port Proposal

P415 CAC Tank Revision, Water Perforating, Option II



Fasteners

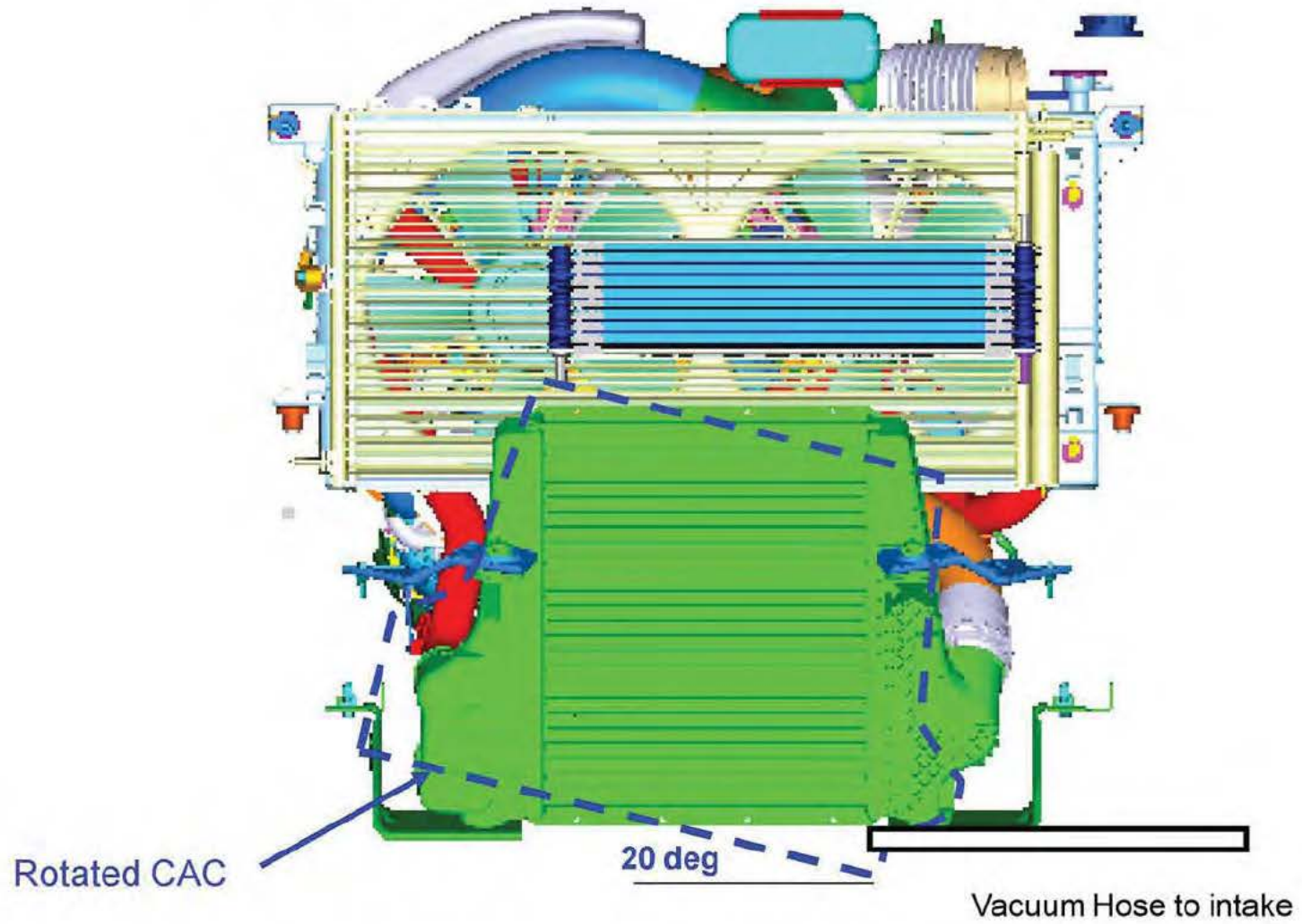
Current P415 CAC Outlet Tank



Modified and Tested CAC, with perforating baffle



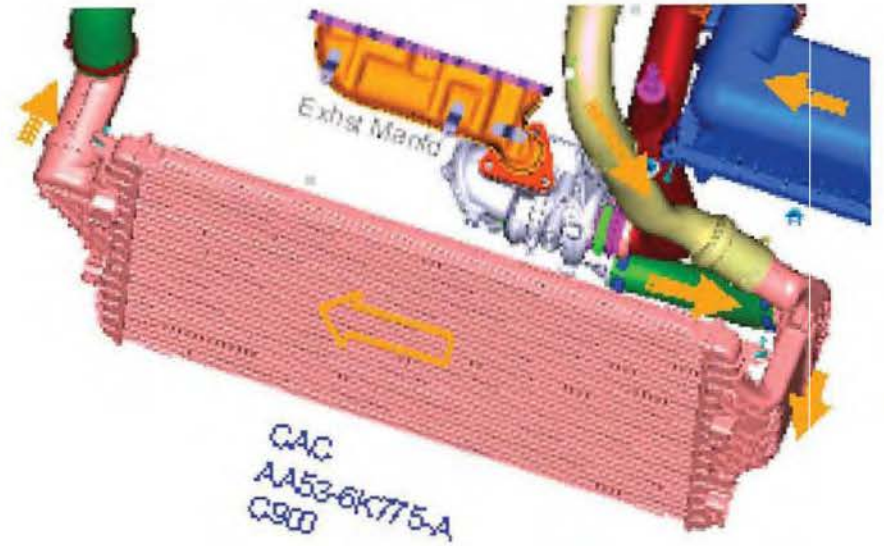
P415, Proposal for Rotating CAC + Vacuum Tube



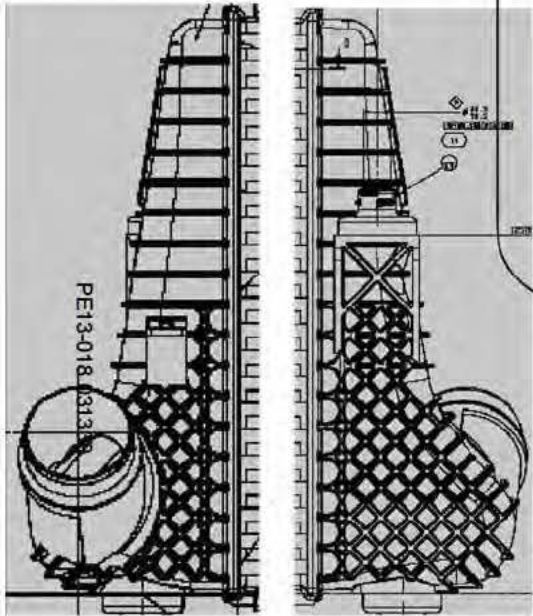
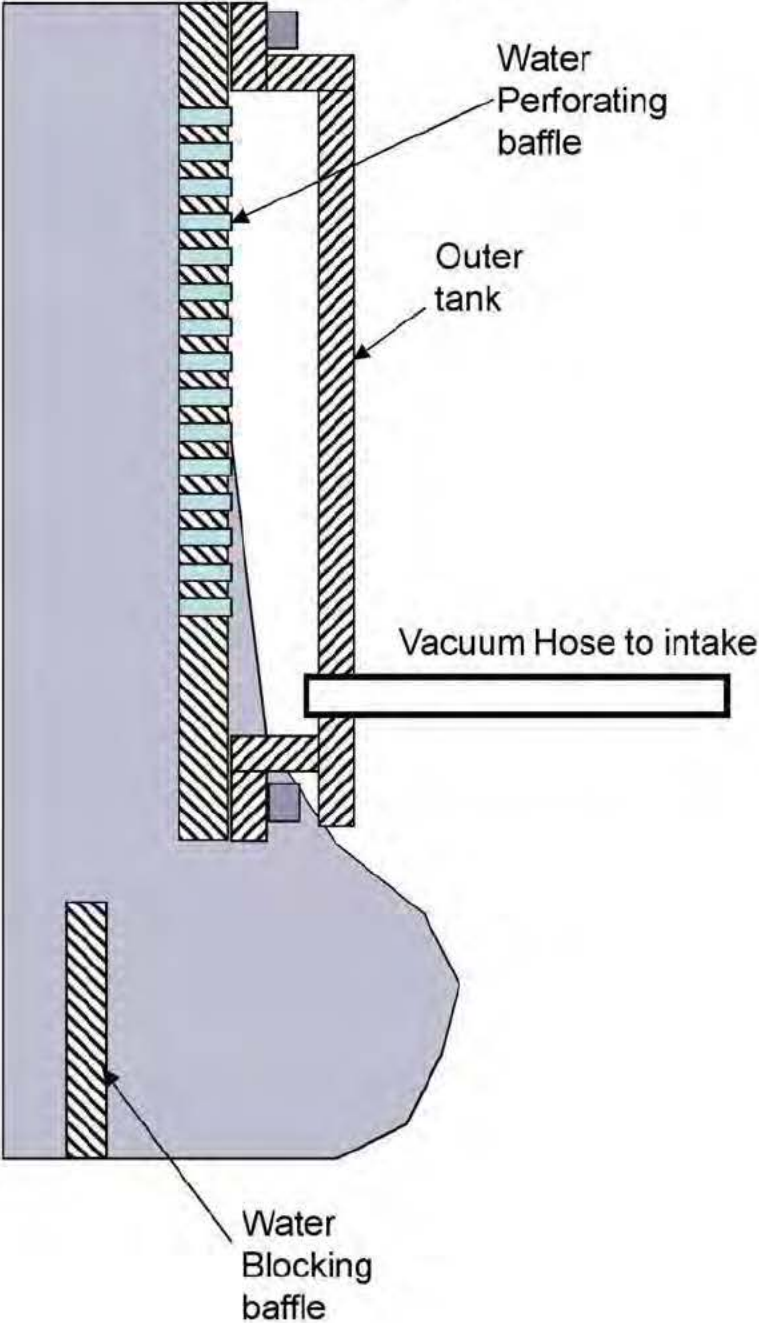
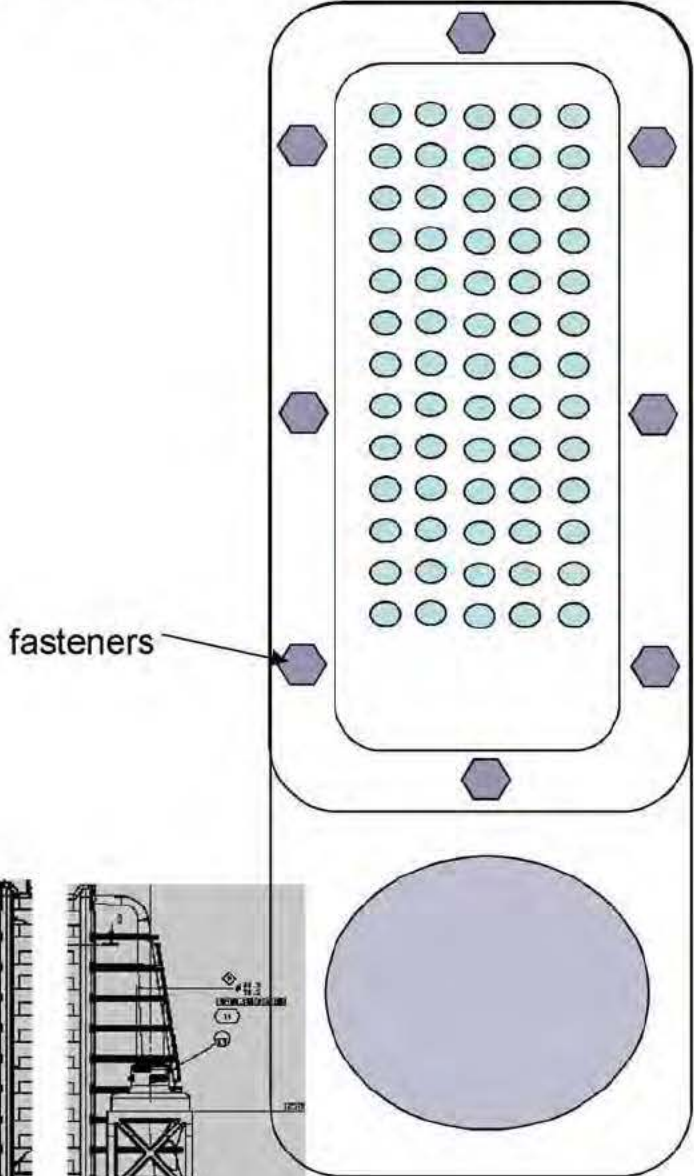
P131 6.0 Diesel CAC



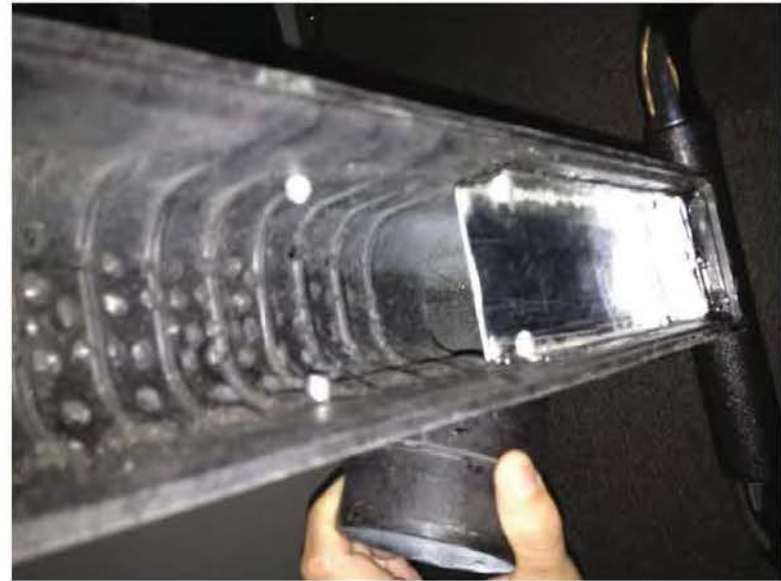
D3 3.5L GTDI CAC



P415 CAC Tank Revision, Water Perforating, Collecting, and Sucking to Intake



Modified and Tested CAC, with perforating baffle



PE13-018

FORD

8-23-2013

APPENDIX G

Engineering Review

13



P415
Outlet Tank
Design Concept
Condensation Issue

Feb 22th 2012

Rev.1

CAC P415 GTDI

P415 CAC Design Revision, Option I

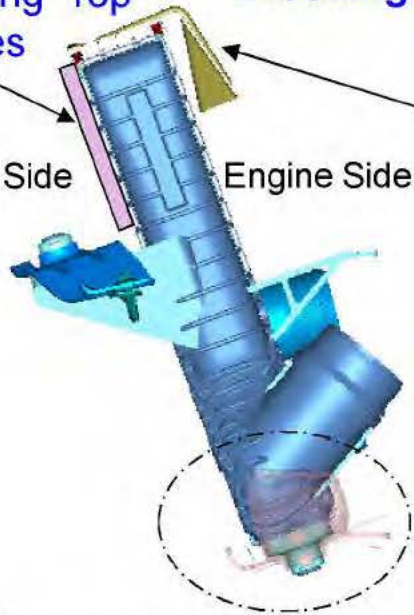
Blocking upper 6 tubes and Adding Vacuum-Drained Port

Covering Top 6 Tubes

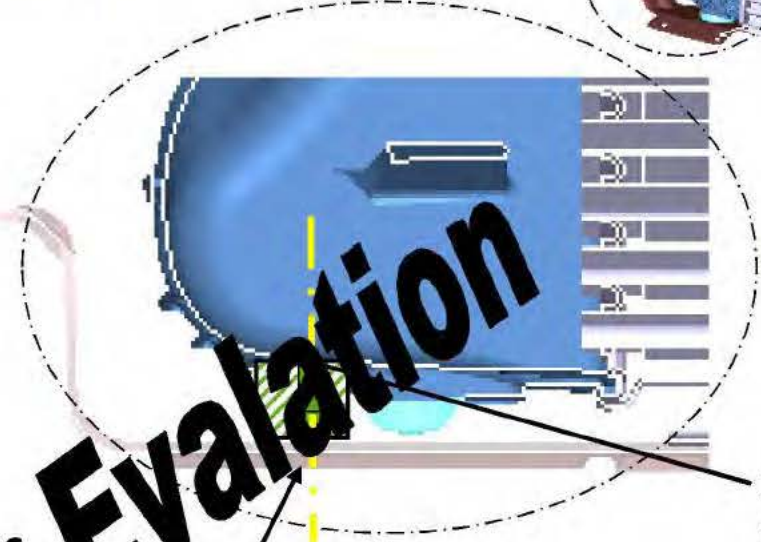
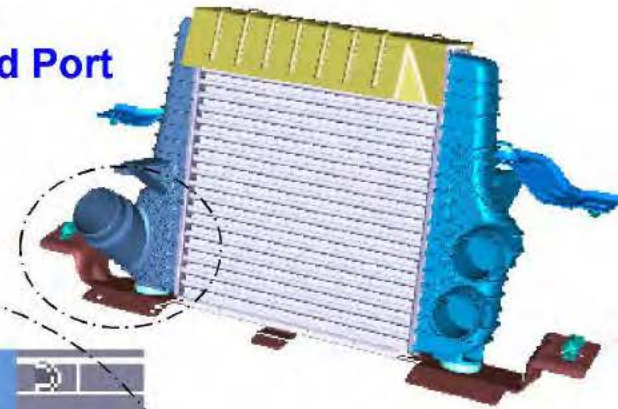
Drill Side

Engine Side

Existing Upper Shield to be modified for Blocking 6 tubes from grill side

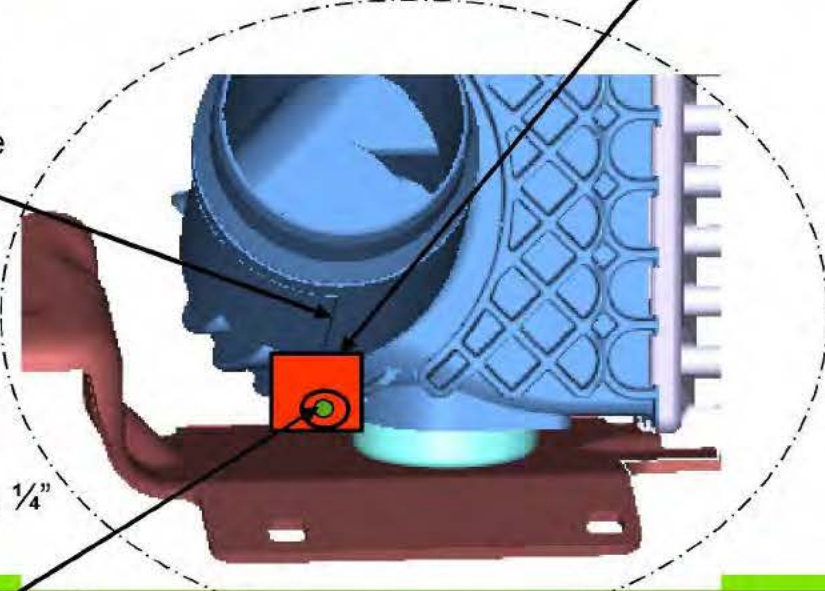


Side View -- On-Vehicle Orientation



2mm hole, flushed with tank

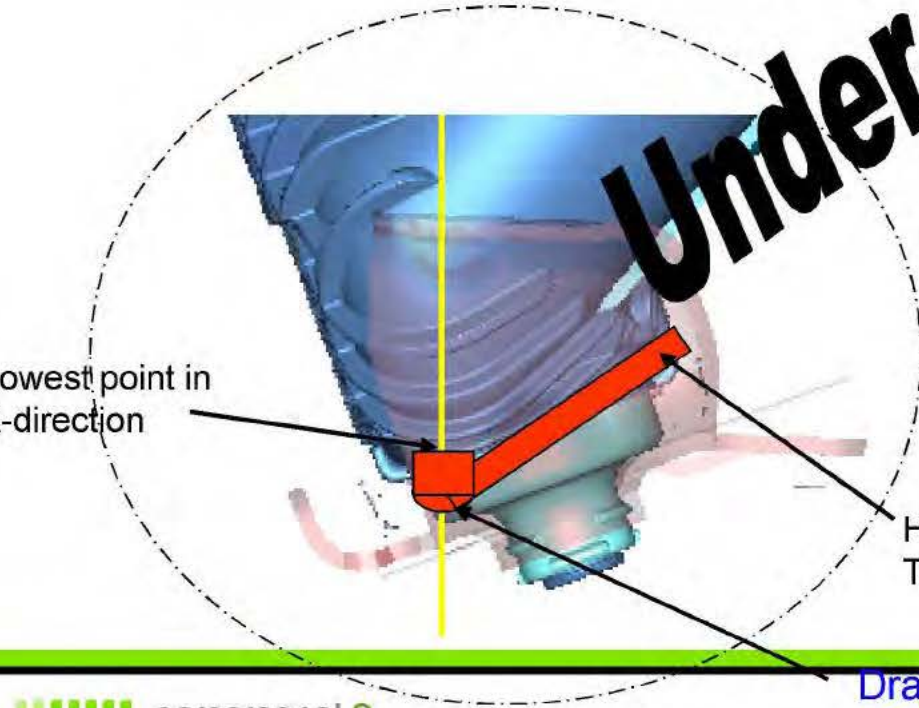
Tank mold Parting Line



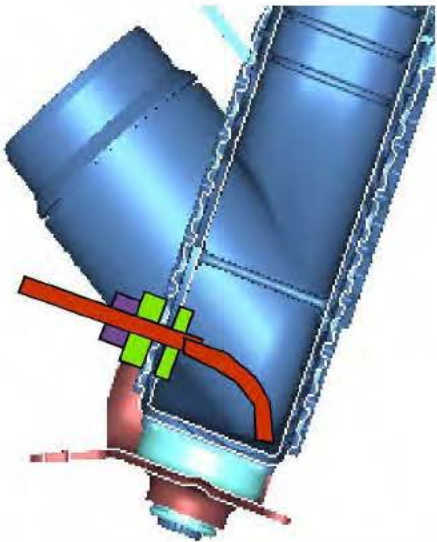
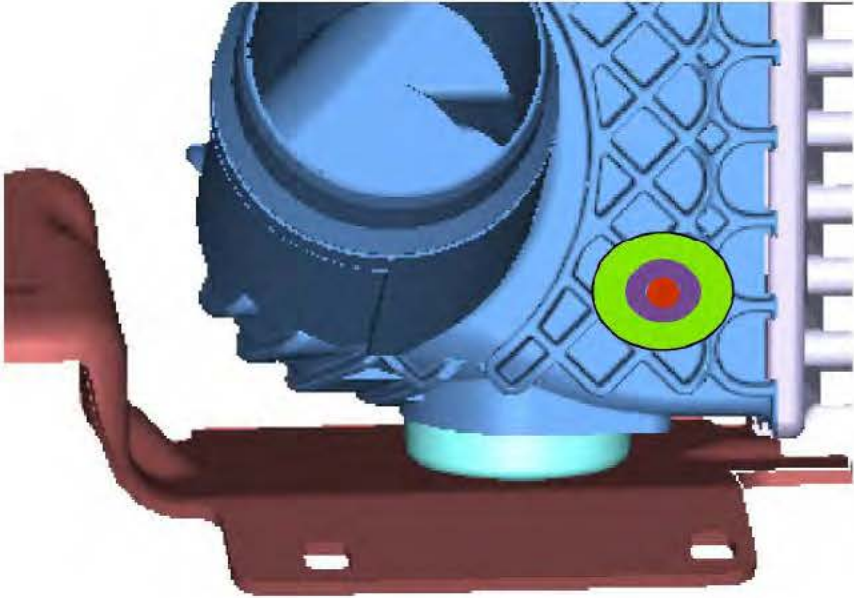
Hose Port, TBD hose size, 1/4"

Drain Port with Inner Hole ID 2mm

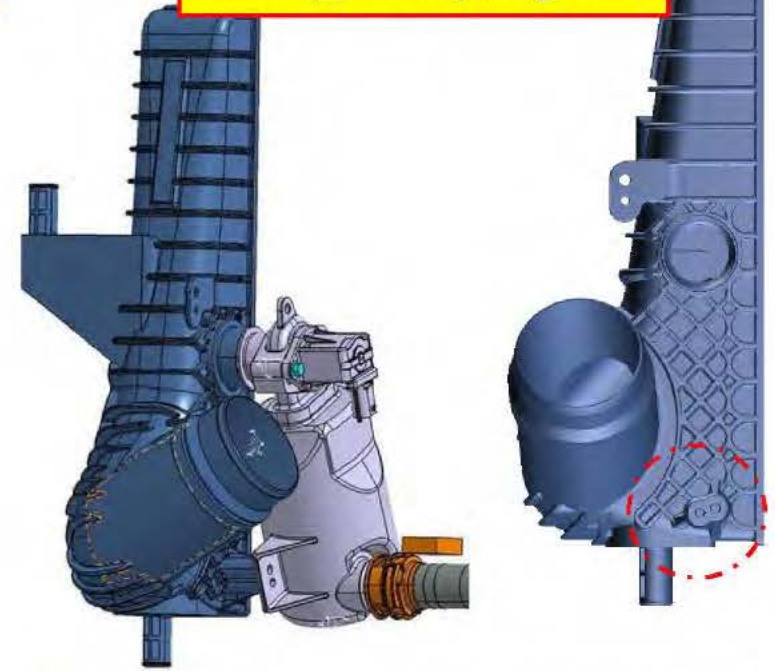
Lowest point in X-direction



Vacuum-Drained Port
Alternative II – Tube with Fitting

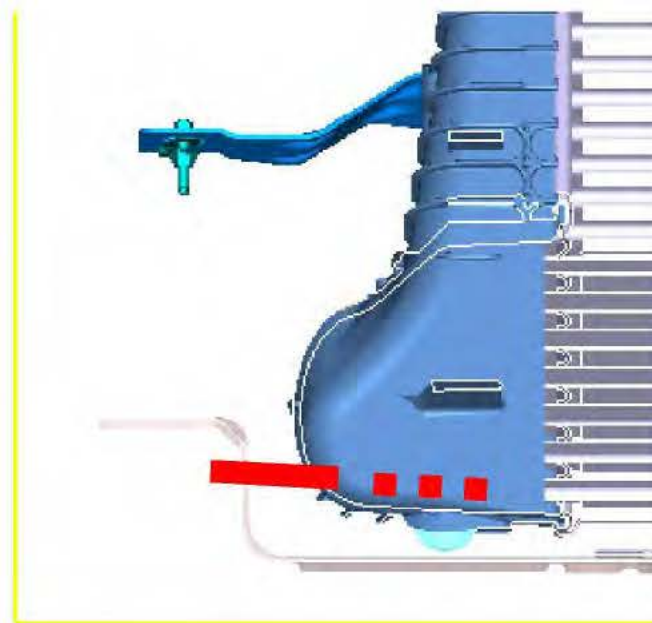
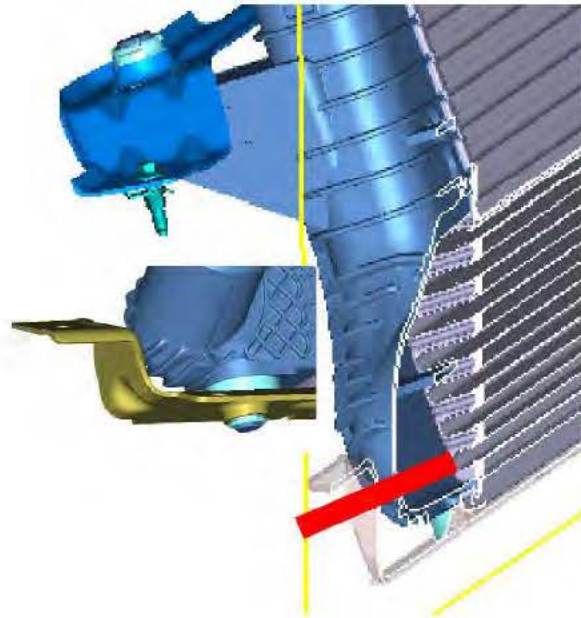


Outlet Tank
P415_2013 program



NOTE:
Mold Feasibility not confirmed yet

Vacuum-Drained Port Alternative III – Transverse Drain Port

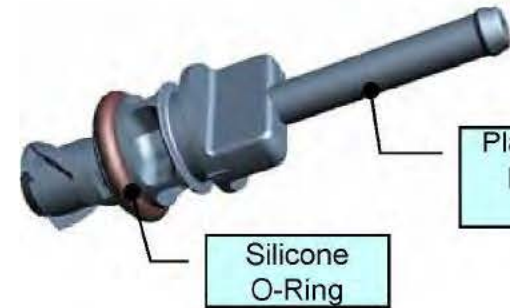


Transverse Drain Port Proposal

Vacuum-Drained Port Alternative III – Valeo Concept Proposal

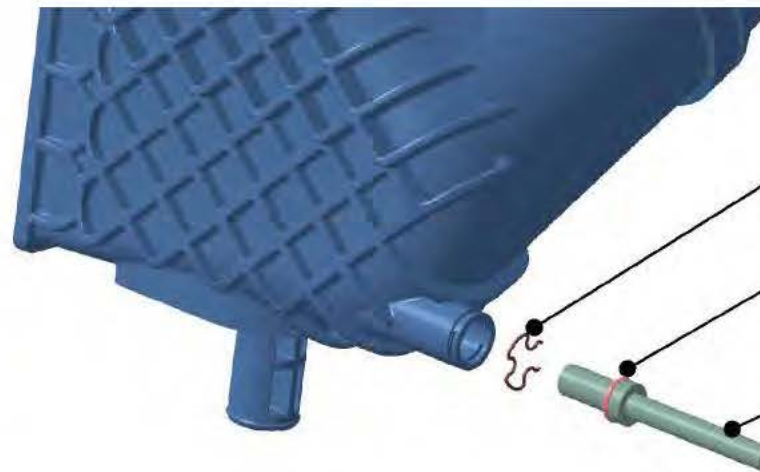


Option III-A: Drain Concept Design, for plastic pipe



Plastic Drain_pipe
Molded in one
part

Silicone
O-Ring



Clip retainer

Silicone
O-Ring

Metal
Drain_pipe

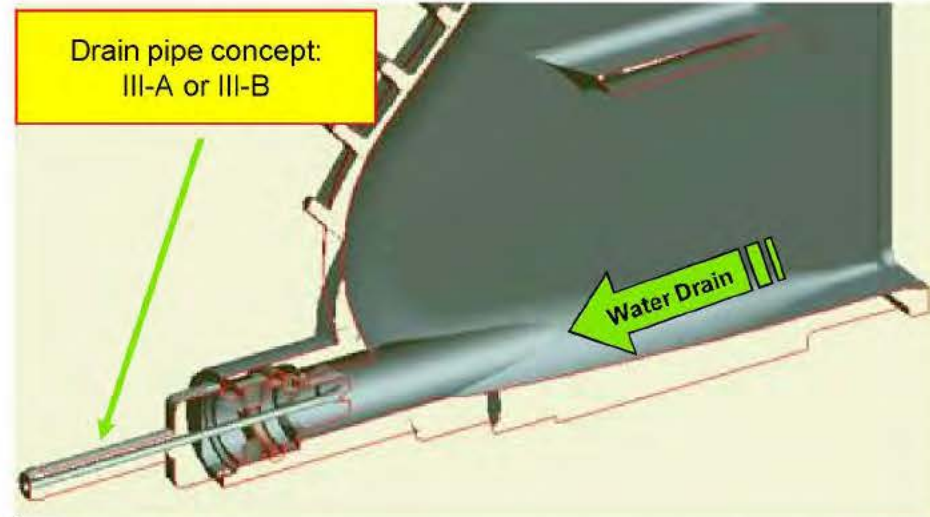
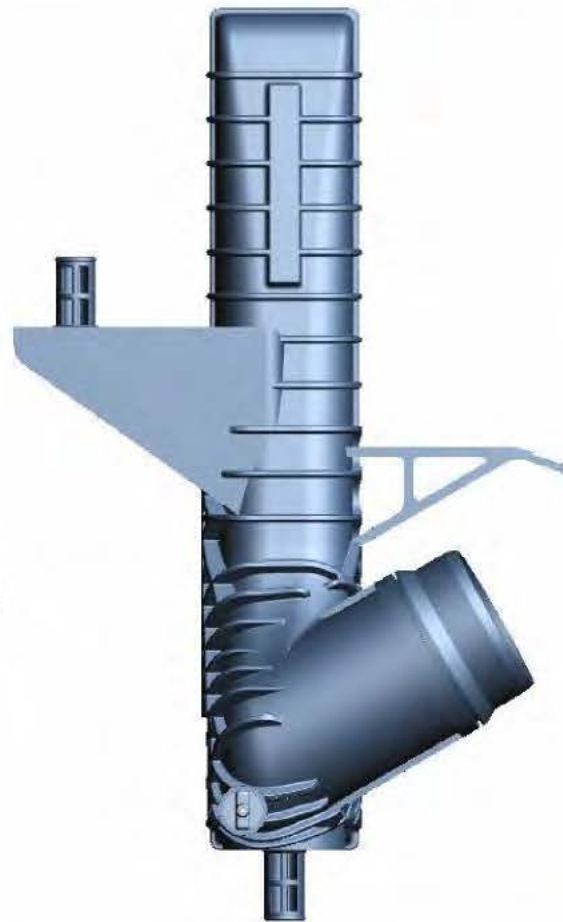
Option III-B: Quick Connector Concept for Metal pipe
(Steel / Aluminum / Brass)

Advantages:
Most robust to
support external
forces
Packaging / less
space

Vacuum-Drained Port Alternative III – Transverse Drain Port



CAC Vehicle position

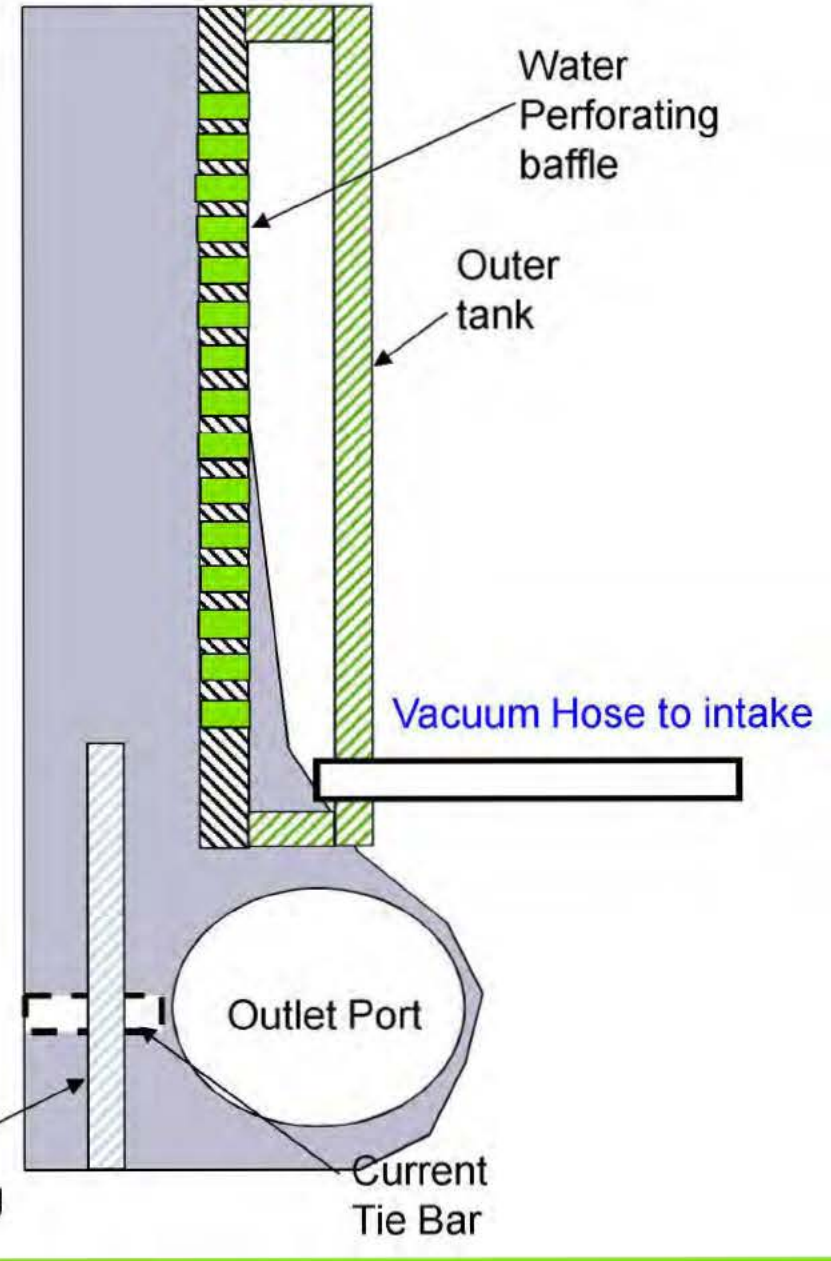
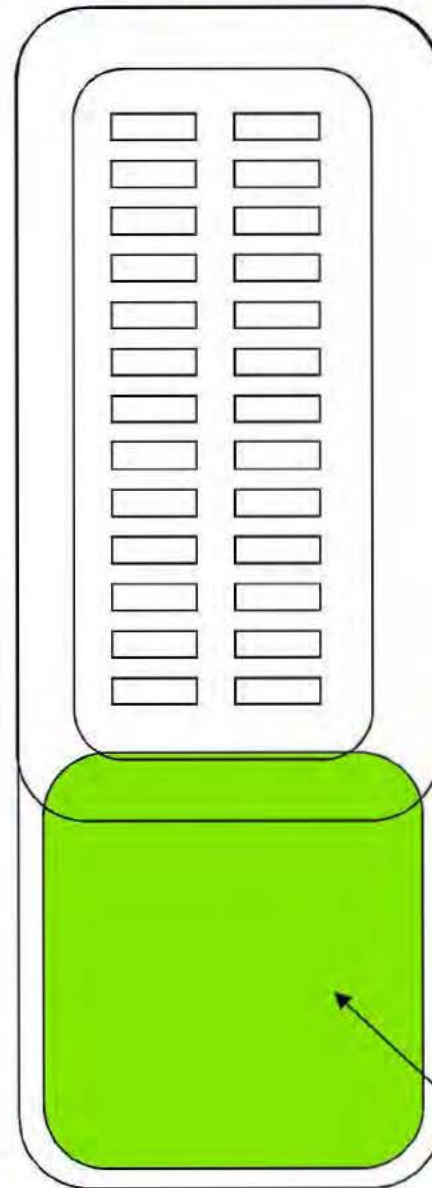
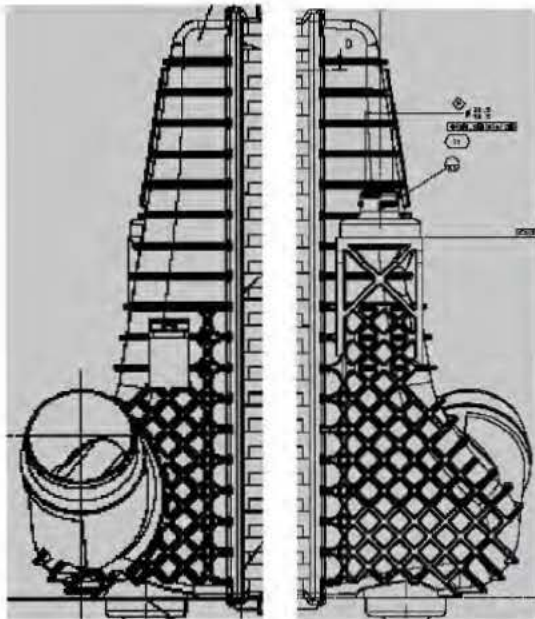


P415 CAC Tank Revision, Water Perforating, Option II



Fasteners

Current P415 CAC
Outlet Tank





Enabling a better automotive world

From: Huang, Larry (L.)
Sent: Thursday, February 23, 2012 11:10 AM
To: Satish NADELLA; Joseph LUMETTA; Andersen, Erik (E.); Tyler, Jim (J.S.); Meyer, Robert (R.H.); Blas-Fernando GUTIERREZ; Kramer, Michael (M.T.); Ladd, John (J.R.); Eduardo BARRIOS; Vicente ALVAREZ; Allan, Valerie (V.J.)
Subject: FW: P415 Concepts
Attachments: Valeo Outlet Tank proposal Rev1.ppt

FYI

Regards,

Larry Huang

Global Cooling/Heat Exchangers

Phone/Text Message: 313-805-2617

E-mail: lhuan3@ford.com

Building #2-3M29, Mail Drop: 1215

From: Eduardo BARRIOS [<mailto:eduardo.barrios@valeo.com>]
Sent: Thursday, February 23, 2012 1:57 PM
To: Huang, Larry (L.); Tyler, Jim (J.S.)
Cc: Joseph LUMETTA; Blas-Fernando GUTIERREZ; Ricardo SANCHEZ
Subject: P415 Concepts

Larry attached you will find a presentation for option II, and Option III for today meeting.

Note: Option II after this meeting we need to perform a design review with Mold supplier (under construction 2013) to review it is possible or not.

regards

--

Eduardo Barrios

TPT Product Engineering Supervisor (SLP)
Valeo Powertrain Thermal Systems
Eje 130 esq CFE s/n.
C.P 78395 Zona Ind. del Potosí.
San Luis Potosí, Mex.
Tel: 0052 444 826 6655

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